HIGH-CLEARANCE CENTER PIVOT SUSPENDED BOOM FIELD SPRAYER 9500 & 9600 SERIES

OPERATOR'S MANUAL

LIMITED WARRANTY

FAST AG Solutions warrants to the buyer that the new machinery is free from defects in material and workmanship.

This warranty is only effective as to any new machinery which has not been altered, changed, repaired or treated since its delivery to the buyer, other than by FAST AG Solutions or its authorized dealers or employees, and does not apply to accessories, attachments, tools or parts, sold or operated with the new machinery, if they have not been manufactured by FAST AG Solutions.

FAST AG Solutions shall only be liable for defects in the materials or workmanship attributable to faulty material or bad workmanship that can be proved by the buyer, and specifically excludes liability for repairs arising as a result of normal wear and tear of the new machinery or in any other manner whatsoever, and without limiting the generality of the foregoing, excludes application or installation of parts not completed in accordance with FAST AG Solutions operator's manual, specifications, or printed instructions.

Written notice shall be given by registered mail, to Fast Distributing within seven (7) days after the defect shall have become apparent or the repairs shall have become necessary, addressed as follows: FAST AG Solutions 4130 Commerce Boulevard, Windom, MN 56101.

This warranty shall expire two (2) years after the date of delivery of the new machinery.

If these conditions are fulfilled, Fast shall at its own cost and at its own option either repair or replace any defective parts provided that the buyer shall be responsible for all expenses incurred as a result of repairs, labor, parts, transportation or any other work, unless Fast has authorized such expenses in advance.

The warranty shall not extend to any repairs, changes, alterations, or replacements made to the new equipment other than by Fast or its authorized dealers or employees.

This warranty extends only to the original owner of the new equipment.

Rubber parts are not warranted. (including tires, hoses, grommets)

This warranty is limited to the terms stated herein and is in lieu of any other warranties whether express or implied, and without limiting the generality of the foregoing, excluded all warranties, express or implied or conditions whether statutory or otherwise as to quality and fitness for any purpose of the new equipment. Fast disclaims all liability for incidental or consequential damages.

This sprayer is subject to design changes and FAST AG Solutions shall not be required to retro-fit or exchange items on previously sold units except at its own option.

Fast Distributing Inc.

SERIAL NUMBER LOCATION

Always give your dealer the serial number of your Fast Distributing Center Pivot High-Clearance Suspended Boom Field Sprayer when ordering parts or requesting service or other information.

The serial number is stamped on a serial tag attached to the trailer frame by the ladder where indicated. Please mark the number in the space provided for easy reference.

Model Number 9_ _ _

Sprayer Serial Number 9_ _ _ _ _ _ _ _ _ _ _

TABLE OF CONTENTS

SECTION **DESCRIPTION**

PAGE

1 INTRODUCTION

Congratulations on your choice of a FAST AG Solutions 9500, 9600 Series Center Pivot High-Clearance Suspended Boom Field Sprayer to complement your farming operation. This equipment has been designed and manufactured to meet the needs of a discriminating buyer for the efficient spraying of crops.

Safe, efficient and trouble free operation of your FAST AG Solutions Field Sprayer requires that you and anyone else who will be operating or maintaining the Sprayer, read and understand the Safety, Opera-tion, Maintenance and Trouble Shooting information contained in the Operator's Manual.

This manual covers 9500, 9600 Series Center Pivot High-Clearance Suspended Boom Field Sprayers built by FAST AG Solutions. Use the Table of Contents or Index as a guide when searching for specific information.

Keep this manual handy for frequent reference and to pass on to new operators or owners. Call your Fast dealer or distributor if you need assistance or information.

OPERATOR ORIENTATION - The directions left, right, front and rear, as mentioned throughout this manual, are as seen from the tractor driver's seat and facing in the direction of travel.

2 SAFETY

SAFETY ALERT SYMBOL

This Safety Alert symbol means
ATTENTION! BECOME ALERT!
YOUR SAFETY IS INVOLVED!

The Safety Alert symbol identifies important safety messages on the Fast Distributing Center Pivot High-Clearance Suspended Boom Field Sprayer and in the manual. When you see this symbol, be alert to the possibility of personal injury or death. Follow the instructions in the safety message.

Why is SAFETY important to you?

3 Big Reasons

Accidents Disable and Kill
Accidents Cost
Accidents Can Be Avoided

SIGNAL WORDS:

Note the use of the signal words **DANGER, WARNING** and **CAUTION** with the safety messages. The appropriate signal word for each message has been selected using the following guide-lines:

DANGER - Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations, typically for machine components that, for functional purposes, cannot be guarded.

WARNING - Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.

CAUTION - Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

If you have any questions not answered in this manual or require additional copies or the manual is damaged, please contact your dealer or FAST AG Solutions, 4130 Commerce Boulevard, Windom, MN 56101, (Telephone) 507-427-3861, (FAX) 507-427-3030.

SAFETY

YOU are responsible for the **SAFE** operation and maintenance of your Fast Distributing Center Pivot High-Clearance Suspended Boom Field Sprayer. **YOU** must ensure that you and anyone else who is going to operate, maintain or work around the Sprayer be familiar with the operating and maintenance procedures and related **SAFETY** information contained in this manual. This manual will take you step-by-step through your working day and alerts you to all good safety practices that should be adhered to while operating the Sprayer.

Remember, **YOU** are the key to safety. Good safety practices not only protect you but also the people around you. Make these practices a working part of your safety program. Be certain that **EVERYONE** operating this equipment is familiar with the recommended operating and maintenance procedures and follows all the safety precautions. Most accidents can be prevented. Do not risk injury or death by ignoring good safety practices.

- Sprayer owners must give operating instructions to operators or employees before allowing them to operate the Sprayer, and at least annually thereafter per OSHA regulation 1928.57.

- The most important safety feature on this equipment is a **SAFE** operator. It is the operator's responsibility to read and understand **ALL** Safety and Operating instructions in the manual and to follow these. All accidents can be avoided.

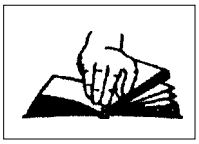
- A person who has not read and understood all operating and safety instructions is not qualified to operate the machine. An untrained operator exposes himself and bystanders to possible serious injury or death.

- Do not modify the equipment in any way. Unauthorized modification may impair the function and/or safety and could affect the life of the equipment.

- Think SAFETY! Work SAFELY!

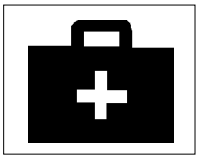
2.1 GENERAL SAFETY

1. Read and understand the Operator's Manual and all safety signs before operating, maintaining or adjusting the Sprayer.



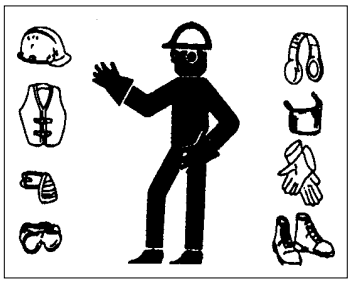
2. Only trained competent persons shall operate the Sprayer. An untrained operator is not qualified to operate the machine.

3. Have a first-aid kit available for use should the need arise and know how to use it.



4. Do not allow riders.

5. Wear appropriate protective gear. This list includes but is not limited to:
   - A hard hat
   - Rubber boots
   - Protective goggles
   - Neoprene gloves
   - Water repellent clothing
   - Respirator or filter mask



6. Place all controls in neutral, stop tractor engine, turn monitor off, set park brake, remove ignition key, wait for nozzles to stop spraying before servicing, adjusting, repairing or unplugging.

7. Read chemical manufacturers warnings, instructions and procedures before starting and follow them exactly.

8. Post Poison Control Emergency telephone number for your area on sprayer before using Agricultural chemicals.

   Ottawa: (613) 992-5606
   Washington DC: (202) 962-4525

   Have container label handy when seeking medical attention.

9. Review safety related items with all personnel annually.

2.2 OPERATING SAFETY

1. Read and understand the Operator's Manual and all safety signs before using.

2. Place all controls in neutral, stop tractor engine, turn monitor off, set park brake, remove ignition key, wait for nozzles to stop spraying before servicing, adjusting, repairing or unplugging.

3. Before spraying a field, be familiar with all potential hazards: trees, rocks, ditches, gullies, etc. Plan the spraying route to avoid hazards. Remember you are driving a wide machine. USE CAUTION WHEN CORNERING.

4. Keep hands, feet, hair and clothing away from all moving and/or rotating parts.

5. Do not allow riders on the sprayer or tractor during operation or transporting.

6. Clear the area of all bystanders, especially children, before starting or filling with water or chemical.

7. Stay away from wing pinch points when folding or extending wings. Keep others away.

8. Stay away from power lines when extending or folding wings. Electrocution can occur without direct contact.

9. Read chemical manufacturers warnings, instructions and procedures before starting and follow them exactly.

10. Do not breathe, touch or ingest chemicals. Always wear protective clothing and follow safe handling procedures.

11. Spray only when potential for chemical drift is at a minimum. Even small amounts can affect neighboring crops or sensitive plants and people.

12. Dispose of chemical containers by triple rinsing them into the sprayer tank or thoroughly rinsing, crushing and delivering to regional disposal site.

13. In case of poisoning, get immediate medical attention.

14. Only rinse sprayer while still in the field. Spray the rinse thinly over the field already sprayed. Never contaminate the farmyard or drainage systems with sprayer rinse.

15. Do not eat in the field when spraying.

16. Before applying pressure to the hydraulic system, make sure all components are tight and that steel lines, hoses and couplings are in good condition.

17. Before applying pressure to chemical system make sure that all connections are tight and that all hoses and fittings are in good condition.

18. Review safety instructions annually.

2.3 CHEMICAL SAFETY

1. Some Agricultural chemicals are among the most toxic substances known to man. Minute quantities can contaminate clothing, machinery, the workplace and the environment. Follow the chemical manufacturers' instructions exactly. Death can result from their improper use.

2. Misuse, including excessive rates, uneven application, wind drift, and label violations can cause injury to crops, livestock, persons and the environment.

3. Do not breathe, touch or ingest chemicals, Always wear protective clothing and follow safe handling procedures.

4. Follow the manufacturers' instructions for chemical storage. Avoid unnecessary storage by purchasing only the quantity needed for the crop year.

5. Keep all chemicals out of reach of children and away from livestock and animals.

6. Store chemicals only in their original containers and in a locked area.

7. Check with state environment department regarding the disposal of small quantities of chemicals, chemical containers and wash water. Follow their disposal instructions.

8. Do not burn the containers or leave them lying in the field or ditches. Dispose of them by triple rinsing and leaving at a pesticide container disposal site.

9. Wash thoroughly before eating. Use a detergent to remove all chemical residue. Rinse carefully and dry with disposable towels.

10. Do not eat in the field when spraying.

11. In case of chemical poisoning, get immediate medical attention. Have container label handy when seeking medical attention.

12. Post Poison Control Emergency telephone number for your area on sprayer before using Agricultural chemicals.

    Ottawa: (613) 992-5606
    Washington DC: (202) 962-4525

    Have container label handy when seeking medical attention.

13. Thoroughly wash clothing and equipment contaminated by chemicals.

14. Do not allow children or workers on contaminated sprayer.

15. Rinse sprayer while still in the field. Spray the rinse thinly over the field already sprayed. Never contaminate the farmyard or drainage systems with sprayer rinse.

16. Do not use the sprayer to transport drinking water.

17. Wash down the Sprayer immediately after field work. Dispose of the wash water in an environmentally safe manner. Wash water can contaminate the soil or a clean water supply.

2.4 MAINTENANCE SAFETY

1. Review the Operator's Manual and all safety items before working with, maintaining or operating the Sprayer.

2. Place all controls in neutral, stop the tractor engine, turn monitor off, set park brake, remove ignition key, wait for nozzles to stop spraying before servicing, adjusting, repairing or unplugging.

3. Follow good shop practices:

   - Keep service area clean and dry.
   - Be sure electrical outlets and tools are properly grounded.
   - Use adequate light for the job at hand.

4. Before applying pressure to a hydraulic system, make sure all components are tight and that steel lines, hoses and couplings are in good condition.

5. Before applying pressure to chemical system make sure that all connections are tight and that all hoses and fittings are in good condition.

6. Relieve pressure from hydraulic circuit before servicing or disconnecting from tractor.

7. Keep hands, feet, clothing and hair away from all moving and/or rotating parts.

8. Clear the area of bystanders, especially children, when carrying out any maintenance and repairs or making any adjustments or filling.

9. Place stands or blocks under the frame before working beneath the machine.

10. Wear safety goggles, neoprene gloves and protective clothing when working on the sprayer filled with active chemical.

11. Wash machine to remove all chemical residue before working on unit. Wear appropriate protective gear at all times.

12. Protect yourself from chemical contamination.

2.5 HYDRAULIC SAFETY

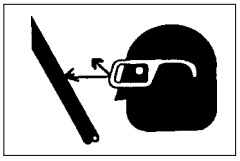
1. Always place all tractor hydraulic controls in neutral before dismounting.

2. Make sure that all components in the hydraulic system are kept in good condition and are clean.

3. Replace any worn, cut, abraded, flattened or crimped hoses and steel lines.

4. Do not attempt any makeshift repairs to the hydraulic lines, fittings or hoses by using tape, clamps or cements. The hydraulic system operates under extremely high-pressure. Such repairs will fail suddenly and create a hazardous and unsafe condition.

5. Wear proper hand and eye protection when searching for a high-pressure hydraulic leak. Use a piece of wood or cardboard as a backstop instead of hands to isolate and identify a leak.



6. If injured by a concentrated high-pressure stream of hydraulic fluid, seek medical attention immediately. Serious infection or toxic reaction can develop from hydraulic fluid piercing the skin surface.

7. Before applying pressure to the system, make sure all components are tight and that lines, hoses and couplings are in good condition.

2.6 TRANSPORT SAFETY

1. Read and understand ALL the information in the Operator's Manual regarding procedures and SAFETY when operating the Sprayer in the field and/or on the road.

2. Check with local authorities regarding sprayer transport on public roads. Obey all applicable laws and regulations.

3. Always travel at a safe speed. Use caution and appropiate speed when making corners or meeting traffic.

4. Make sure the SMV (Slow Moving Vehicle) emblem and all the lights and reflectors that are required by the local highway and transport authorities are in place, are clean and can be seen clearly by all overtaking and oncoming traffic.

5. Be sure that the Sprayer is hitched positively to the towing vehicle. Always use a retainer through the pin and a safety chain between the machine and the tractor.

6. Keep to the right and yield the right-of-way to allow faster traffic to pass. Drive on the road shoulder, if permitted by law.

7. Do not exceed 20 mph (32 km/h). Reduce speed on rough roads and surfaces.

8. Always use hazard warning flashers on tractor when transporting unless prohibited by law.

9. Never transport with the tank filled with water or chemical.

2.7 TIRE SAFETY

1. Failure to follow proper procedures when mounting a tire on a wheel or rim can produce an explosion which may result in serious injury or death.

2. Do not attempt to mount a tire unless you have the proper equipment and experience to do the job.

3. Have a qualified tire dealer or repair service perform required tire maintenance.

2.8 STORAGE SAFETY

1. Store unit in an area away from human activity.

2. Do not permit children to play on or around the stored sprayer.

3. Unhook and store in the transport configuration.

2.9 SAFETY SIGNS

1. Keep safety signs clean and legible at all times.

2. Replace safety signs that are missing or have become illegible.

3. Replaced parts that displayed a safety sign should also display the current sign.

4. Safety signs are available from your Distributor or the factory.

How to Install Safety Signs:

- Be sure that the installation area is clean and dry.
- Be sure temperature is above 50°F (10°C).
- Decide on the exact position before you remove the backing paper.
- Remove the smallest portion of the split backing paper.
- Align the sign over the specified area and carefully press the small portion with the exposed sticky backing in place.
- Slowly peel back the remaining paper and carefully smooth the remaining portion of the sign in place.
- Small air pockets can be pierced with a pin and smoothed out using the piece of sign backing paper.

2.10 SIGN-OFF FORM

FAST AG Solutions follows the general Safety Standards specified by the American Society of Agricultural Engineers (ASAE) and the Occupational Safety and Health Administration (OSHA). Anyone who will be operating and/or maintaining the FAST AG Solutions Sprayer must read and clearly understand ALL Safety, Operating and Maintenance information presented in this manual.

Do not operate or allow anyone else to operate this equipment until such information has been reviewed. Annually review this information before the season start-up.

Make these periodic reviews of SAFETY and OPERATION a standard practice for all of your equipment. We feel that an untrained operator is unqualified to operate this machine.

A sign-off sheet is provided for your record keeping to show that all personnel who will be working with the equipment have read and understand the information in the Operator's Manual and have been instructed in the operation of the equipment.

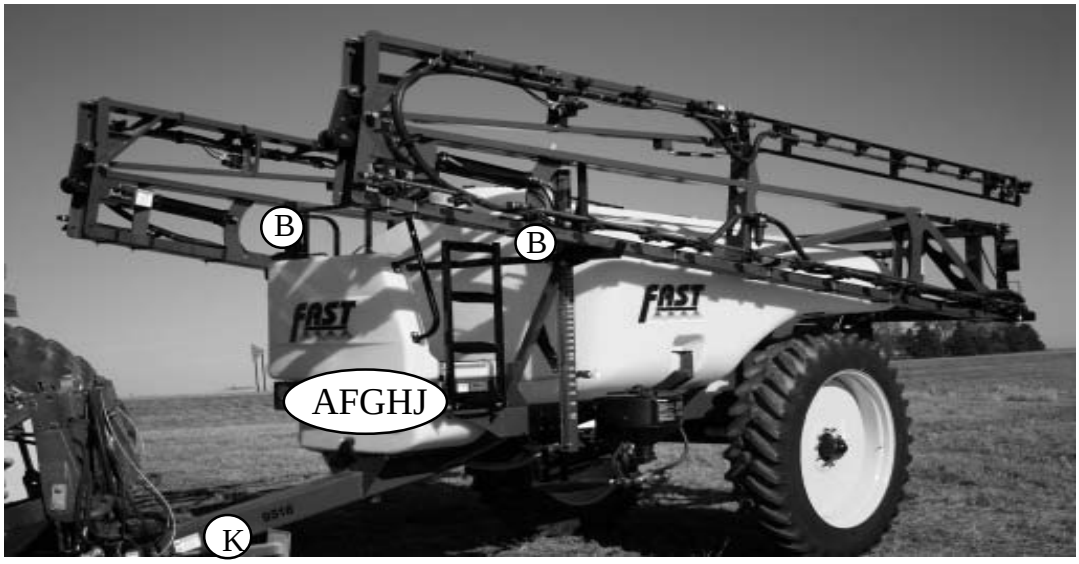
SIGN-OFF FORM

DATE	EMPLOYEES SIGNATURE	EMPLOYERS SIGNATURE

3 SAFETY SIGN LOCATIONS

The types of safety signs and locations on the equipment are shown in the illustration below. Good safety requires that you familiarize yourself with the various Safety Decals, the type of warning and the area, or particular function related to that area, that requires your SAFETY AWARENESS.

- Think SAFETY! Work SAFELY!



A

CAUTION

1. **Read and understand the Operator's Manual before using.**
2. **Read Chemical manufacturers' WARNINGS, instructions and procedures before starting and follow them exactly.**
3. **Stop tractor engine, place all controls in neutral, set park brake, remove ignition key and wait for all moving parts to stop before servicing, adjusting, repairing, unplugging or filling.**
4. **Always wear proper eye, breathing and clothing protection.**
5. **Stay away from chemicals, spray and drift. Keep others away.**
6. **Install and secure all guards before starting.**
7. **Keep hands, feet, hair and clothing away from moving parts.**
8. **Do not allow riders.**
9. **Keep all chemical and hydraulic lines, fittings and couplers tight and free of leaks before starting and operating.**
10. **Stay away from overhead power lines.**
11. **Clear the area of bystanders before extending or folding wings.**
12. **Release second wing extend switch before first wing.**
13. **Hitch can upend . Do not stand over hitch when unhooking. Support hitch and sprayer on stands before removing pin.**
14. **Review safety instructions with all operators annually.**

800

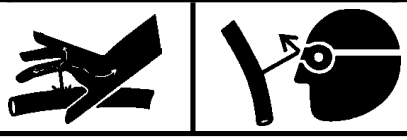
B

WARNING

Install the safety pin and secure before transporting sprayer. 809

C

WARNING



HIGH-PRESSURE FLUID HAZARD

To prevent serious injury or death from high pressure fluid:

- Relieve pressure on system before repairing, adjusting or disconnecting.
- Wear proper hand and eye protection when searching for leaks. Use wood or cardboard instead of hands.
- Keep all components in good repair.

802

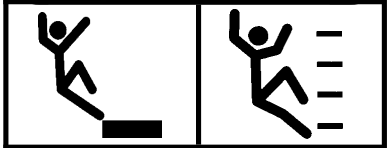
REMEMBER - If Safety Signs have been damaged, removed, become illegible or parts replaced without safety designs, new signs must be applied. New safety signs are available from your authorized dealer.

The types of safety signs and locations on the equipment are shown in the illustration below. Good safety requires that you familiarize yourself with the various Safety Decals, the type of warning and the area, or particular function related to that area, that requires your SAFETY AWARENESS.

- Think SAFETY! Work SAFELY!

D

WARNING



FALLING HAZARD

To prevent serious injury or death from falling:

- **Use care when climbing ladder or working on platform.**
- **Keep unauthorized people off machine.**

801

F

WARNING

TOXIC CHEMICAL HAZARD

Agricultural chemicals can be dangerous. Improper selection or use can seriously injure persons, animals, plants, soil or other property. BE SAFE: Select the right chemical for the job. Handle it with care. Follow the instructions on the container label and instructions from the equipment manufacturer.

807

G

DANGER

ELECTROCUTION HAZARD

KEEP AWAY FROM POWER LINES

To prevent serious injury or death from electrocution:

1. **Stay well away from power lines when folding or extending wings. Electrocution can occur without direct contact.**
2. **Lower wings completely before moving or transporting.**

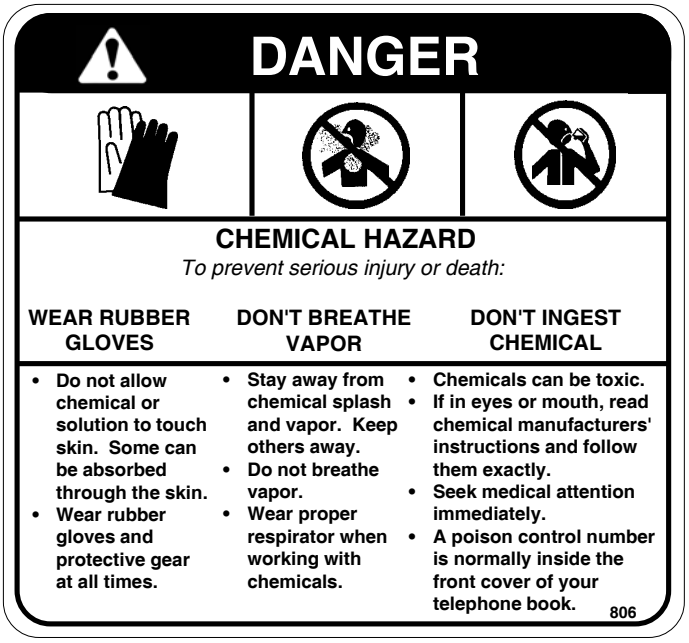
805

REMEMBER - If Safety Signs have been damaged, removed, become illegible or parts replaced without safety designs, new signs must be applied. New safety signs are available from your authorized dealer.

The types of safety signs and locations on the equipment are shown in the illustration below. Good safety requires that you familiarize yourself with the various Safety Decals, the type of warning and the area, or particular function related to that area, that requires your SAFETY AWARENESS.

- Think SAFETY! Work SAFELY!

H



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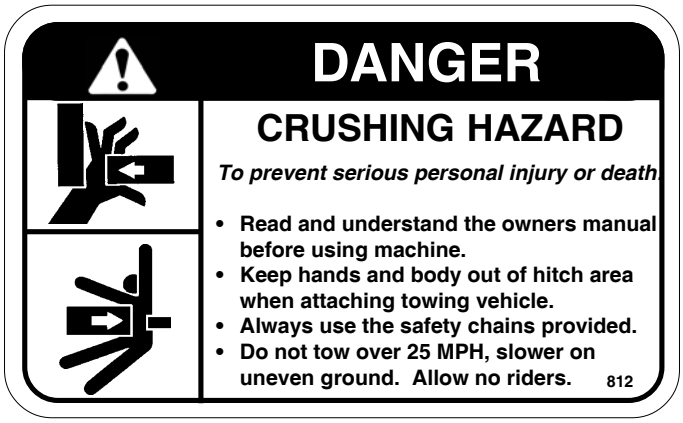

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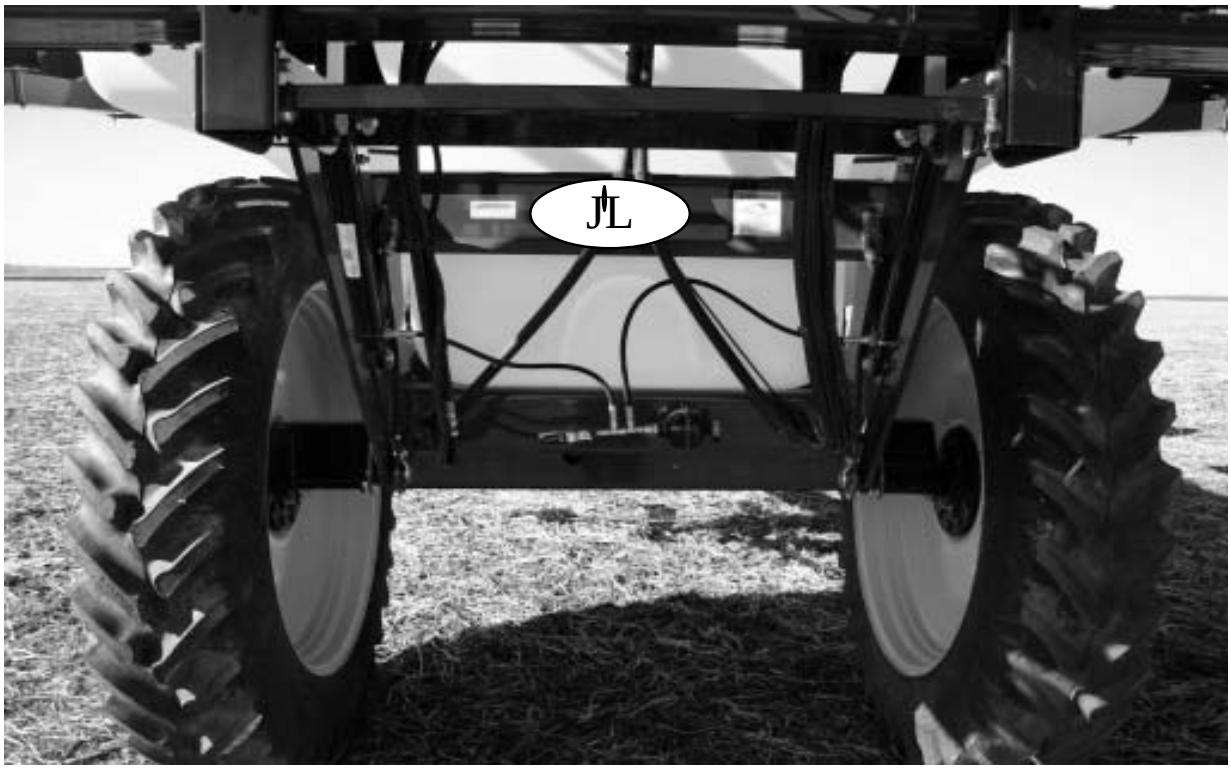


L

WARNING

Raise boom and turn cylinder valve off before transporting or working under the boom.

REMEMBER - If Safety Signs have been damaged, removed, become illegible or parts replaced without safety designs, new signs must be applied. New safety signs are available from your authorized dealer.

4 OPERATION

OPERATING SAFETY

1. Read and understand the Operator's Manual and all safety signs before using.
2. Place all controls in neutral, stop tractor engine, turn monitor off, set park brake, remove ignition key, wait for nozzles to stop spraying before servicing, adjusting, repairing or unplugging.
3. Before spraying a field, be familiar with all potential hazards: trees, rocks, ditches, gullies, etc. Plan the spraying route to avoid hazards. Remember you are driving a wide machine. USE CAUTION WHEN CORNERING.
4. Keep hands, feet, hair and clothing away from all moving and/or rotating parts.
5. Do not allow riders on the sprayer or tractor during operation or transporting.
6. Clear the area of all bystanders, especially children, before starting or filling with water or chemical.
7. Stay away from wing pinch points when folding or extending wings. Keep others away.
8. Stay away from power lines when extending or folding wings. Electrocution can occur without direct contact.
8. Read chemical manufacturers warnings, instructions and procedures before starting and follow them exactly.
9. Do not breathe, touch or ingest chemicals. Always wear protective clothing and follow safe handling procedures.
10. Spray only when potential for chemical drift is at a minimum. Even small amounts can affect neighboring crops or sensitive plants and people.
11. Dispose of chemical containers by triple rinsing them into the sprayer tank or thoroughly rinsing, crushing and delivering to regional disposal site.
12. In case of poisoning, get immediate medical attention.
13. Only rinse sprayer while still in the field. Spray the rinse thinly over the field already sprayed. Never contaminate the farmyard or drainage systems with sprayer rinse.
14. Do not eat in the field when spraying.
15. Before applying pressure to the hydraulic system, make sure all components are tight and that steel lines, hoses and couplings are in good condition.
16. Before applying pressure to chemical system make sure that all connections are tight and that all hoses and fittings are in good condition.
17. Review safety instructions annually.

4.1 TO THE NEW OPERATOR OR OWNER

Todays Agricultural industry works closely with the chemical industry to develop and use the appropriate compound for control of insects, weeds and fungus. Effective results are closely related to application methods and techniques. Fast Distributing Inc. has designed a field sprayer that will place the chemicals exactly where they are needed.

It is the responsibility of the owner or operator to read this manual and the chemical container label before starting. Follow all safety instructions exactly. Safety is everyone's business. By following recommended procedures, a safe working environment is provided for the operator, bystanders and the environment.

Many features incorporated into this machine are the result of suggestions made by customers like you. Read this manual carefully to learn how to operate the machine safely and how to set it to provide maximum field efficiency. By following the operating instructions in conjunction with a good maintenance program, your Sprayer will provide many years of trouble-free service.

4.2 MACHINE COMPONENTS

The FAST AG Solutions Center Pivot High-Clearance Suspended Boom Field Sprayer is a large transportable tank with spray booms to distribute chemicals over a wide area. Chemicals can be added directly into the tank through the top tank lid bottom fill line or through an optional eductor tank. The system is pressurized by a hydraulically powered pump that provides flow for tank agitation, tank washing and boom pressure.

A 100 gallon wash tank is mounted on the front of the frame. A 3 gallon hand rinse tank is mounted on the right side with faucet by ladder . Optional foam markers are available and the tank mounts on the right side of the frame. An optional eductor tank can be mounted on the left side of the frame.

The chemical circuit is plumbed into the tank for agitation to keep the solution mixed or to the rotating ball wash heads for washing or rinsing the tank. A solenoid to each boom controls the flow to the wings and a butterfly valve and flow sensor maintains the system pressure. Nozzles along the wings, distribute the chemical solution over the field. A screen in the line next to the pump and after the solenoids removes contaminants from the system. The chemical system controller is mounted in the tractor cab for easy operation.

The booms attach to and are suspended from the back of the frame. The inner booms swing back at right angles to the frame for field operation. The outer booms pivot up and out for field operation. The wing extensions swings back if they hit an obstruction.

The boom position controller mounts in the cab for easy operation. An adjustable axle provides a wheel spacing of 62, 80 and 120 inches.

A Main Tank
B Wash Tank
C Hand Rinse Tank
D Inner Boom
E Outer Boom
F Break-Away Boom
G Nozzles
H Centrifugal Pump
J Boom Controller
K Chemical Controller

Fig. 1 MACHINE COMPONENTS

4.3 BREAK-IN

Although there are no operational restrictions on the sprayer when used for the first time, it is recommended that the following mechanical items be checked:

A. After operating for 1/2 hour:

1. Retorque all the wheel bolts, see Section 7, Unit Specification for proper torque.
2. Retorque all other fasteners and hardware.
3. Check that all electrical connections are tight.
4. Check that no chemical or hydraulic lines are being pinched or crimped. Re-align as required.
5. Check that all nozzles are working properly. Clean or replace as required.
6. Lubricate all grease fittings.

B. After 5 hours and 10 hours of operation:

1. Retorque all wheel bolts, fasteners and hardware, see Section 7, Unit Specification for proper torque.
2. Check chemical and hydraulic line routing.
3. Check that all nozzles are working properly.
4. Then go to the normal servicing and maintenance schedule as defined in the Maintenance Section.

4.4 PRE-OPERATION CHECKLIST

Efficient and safe operation of the FAST AG Solutions Sprayer requires that each operator reads and understands the operating procedures and all related safety precautions outlined in this section. A pre-operational checklist is provided for the operator. It is important for both personal safety and maintaining the good mechanical condition of the Sprayer that this checklist be followed.

Before operating the Sprayer and each time thereafter, the following areas should be checked off:

1. Lubricate the machine per the schedule outlined in the “Maintenance Section”.
2. Use only a tractor of adequate power and weight to operate the Sprayer. See Section 4.5.1 for recommendations.
3. Ensure that the machine is properly attached to the tractor. Be sure that a mechanical retainer is installed through the drawbar pin and the safety chain is attached to the drawbar cage.
4. Check the hydraulic system. Ensure that the hydraulic reservoir in the tractor is filled to the required specifications.
5. Inspect all hydraulic lines, hoses, fittings and couplers for tightness. Use a clean cloth to wipe any accumulated dirt from the couplers before connecting to the hydraulic system of the tractor.
6. Check the tires and ensure that they are inflated to the specified pressure.
7. Calibrate the sprayer if it is the start of the season or a new chemical is being used.
8. Check the condition and routing of all chemical hoses and lines. Replace any that are damaged. Re-route those that are rubbing, pinched or crimped.
9. Check the spray pattern of each nozzle. Remove and clean or replace any that have an unusual pattern.
10. Remove the steel mesh line filters and wash with clean water. Reinstall.
11. Check that all connections in the electrical system are connected and tight.

4.5 EQUIPMENT MATCHING

To insure the safe and reliable operation of the Sprayer, it is necessary to use a tractor with appropriate specifications. As a guideline, insure that these requirements are met:

1. **Tractor Horsepower:**
   Refer to Table 1 for the recommended horsepower for you machine. Although the power is not required to pull the machine, it will insure that the tractor/sprayer combination has sufficient power to maintain a constant forward speed under all conditions and stability during all operating and transporting conditions.

2. **Drawbar:**
   The tractor drawbar must be set to provide 16 inches (406 mm) between the end of the PTO shaft and the center of the drawbar pin. Refer to your tractor manual for the adjustment procedure. Although the PTO is not used, this dimension must be maintained to provide sufficient clearance between the hitch and tractor tire when turning.

3. **Electrical:**
   A 12 volt 10 amp power source in the cab must be provided to operate the controllers. The controllers operate the solenoids and valves in the chemical circuit and the boom fold valves.

Table 1 HORSEPOWER RECOMMENDATIONS

CONDITIONS	TANK SIZE			
	1000	1250	1800	2400
LEVEL	100	115	150	180
HILLY	125	140	175	205

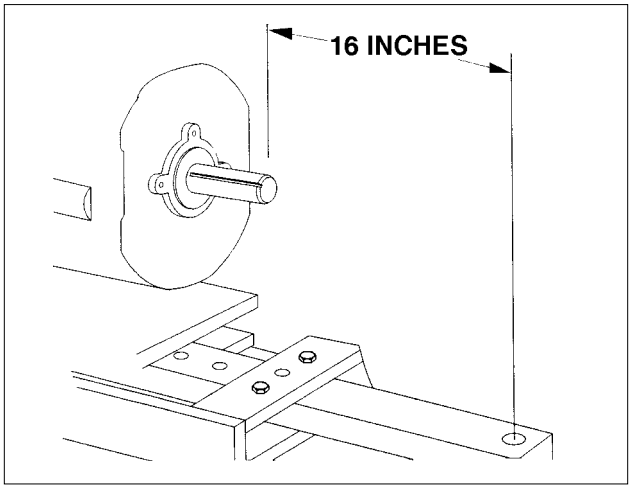


Fig. 2 DRAWBAR DIMENSION

4. **Hydraulic System:**

a. **Chemical Circuit:**
The tractor hydraulic system must be capable of 11 GPM (42 lpm) at 2000 psi (13,800 kPa) to operate the chemical circuit pump. Either closed-center or open-centered systems can be used.

A. **Ace Pumps:**

i. **Closed Center Load Sensing:**
(John Deere 6000, 7000, 8000 & 9000 Series, CaseIH Magnum & Maxxum Series, Ford Genesis). Purchase a Flow limiting Valve (Part No. LS206 or LS304) from your dealer and install it on the inlet port of the ACE Pump hydraulic motor.

Follow the detailed instructions found at the beginning of the PUMP section of the Fast catalogue.

ii. **Closed Center Pressure Compensating:**
(John Deere, except 6000, 7000, 8000 & 9000 Series, AGCO White). Use the Restrictor Orifice that is wire-tied to the ACE pump. Install it in the inlet port of the ACE hydraulic motor.

Follow the detailed instructions found at the beginning of the PUMP section of the Fast catalogue.

iii. **Open Center:**
(Steiger, Cougar and Panther). Do NOT use the Flow Limiting Valve or the Restrictor Orifice.

Follow the detailed instructions found at the beginning of the PUMP section of the Fast catalogue.

B. **Hypro Pump:**

i. **Open Center Systems:**

- Do not use an orifice in the pressure adapter port.
- Start the tractor. Leave the selector valve in neutral and achieve operation RPM and system temperature.
- Open the bypass screw 4 turns.
- With the pump inlet flooded, move the selector valve to the Lower position and allow hydraulic flow to the motor.
- Adjust the bypass screw closed until the desired spraying pressure Is achieved. Account for agitation flow.
- Tighten the lock nut on the bypass screw.

ii. **Closed Center Load Sensing:**

- Do not use an orifice in the pressure adapter port..
- Start the tractor. Leave the selector valve in neutral and achieve operating RPM and system temperature
- Adjust the tractors hydraulic flow control (Tortoise/Hare) to its lowest setting.
- Close and lock the bypass screw.
- With the pump Inlet flooded, move the selector valve to the Lower position and allow hydraulic flow to the motor.
- Adjust the hydraulic flow control valve (Tortoise/l-Hare) until the desired spraying pressure is achieved. Account for agitation flow.

C. **Boom Position:**
The tractor hydraulic system must be capable of 3 gpm (11 lpm) at 2350 psi (15,200 kPa) to operate the boom position circuit. Either closed-center or open-center systems can be used. An orifice is located next to each cylinder to control its rate of movement.

4.6 CONTROLS

All functions on the sprayer are operated by the Controllers mounted in the tractor cab. It is recommended that all operators review this section of the manual to familiarize themselves with the location and function of all machine controls before starting. Refer to the manual supplied with the chemical controller to familiarize yourself with the calibration, operation and troubleshooting procedures for the chemical circuit.

Fig. 3 SPRAY CIRCUIT CONTROLLER

1. **Spray Circuit Controller:**
   A micro-processor based controller is available to set, monitor, adjust and display several spray circuit parameters for the operator. Review and follow the calibration procedure at the start of the season and when changing chemicals or nozzles. Familiarize yourself with each controller function and control before starting.

2. **Chemical Circuit Controls:**

   When an automatic circuit controller system is selected, the monitoring components are installed into the circuit next to the boom solenoids.

   a. Flow meter.
   b. Flow control.
   c. Boom valves.

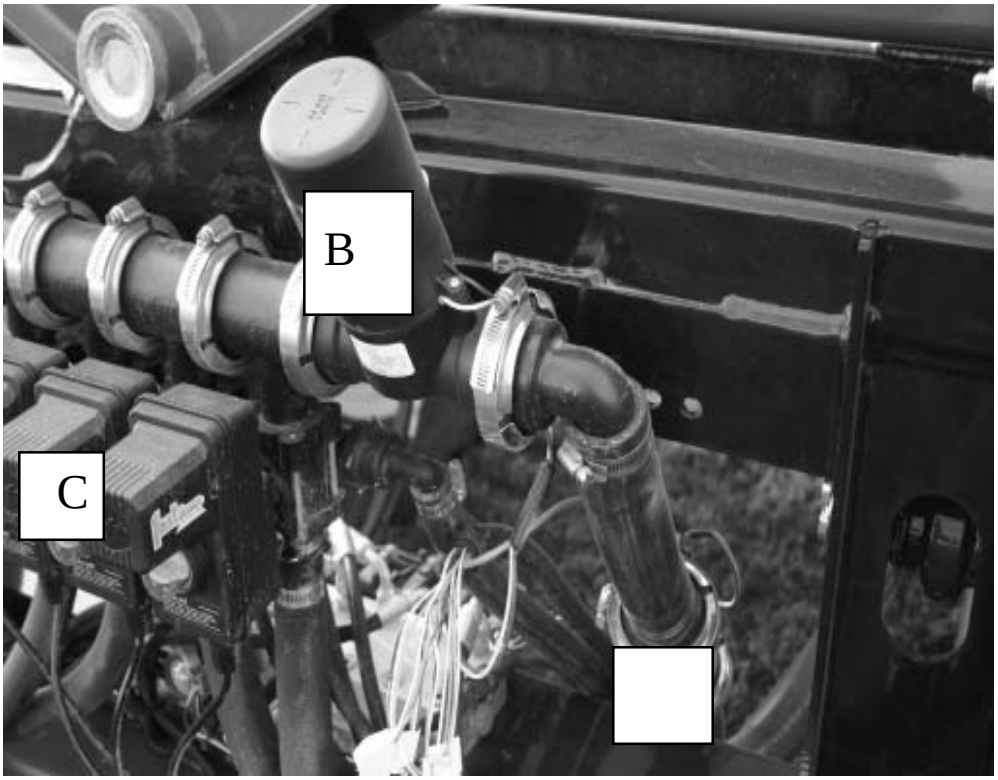


Fig. 4 CHEMICAL CIRCUIT CONTROLS

3. **Boom Function Control Box (5 Function):**
This control box is mounted in the cab and attached to a 12 volt power source. The wiring harness is routed across the hitch and plugs into the connector coming from the trailer. Be sure that there are no power lines next to the machine and that the machine is in an open area large enough to allow the booms to swing out without hitting any obstructions. The hydraulic circuit control lever to the boom function circuit must be placed in detent prior to operating.

Control Box

Fig. 5 BOOM CONTROLS (5 FUNCTION BOX) 9600 60',9500 60-100'

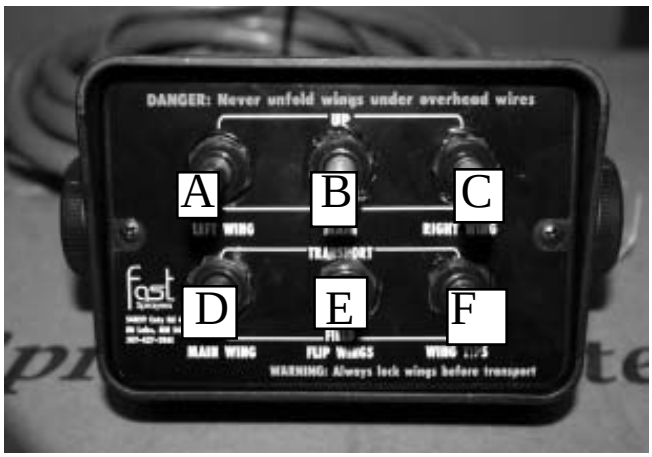


Fig. 5a BOOM CONTROLS (6 FUNCTION BOX)

a. **Left Boom Tilt Position:**
This spring-loaded-to-neutral-center toggle switch controls the left boom tilt function. Move the switch up and hold to raise the tip of the left boom and down to lower. Release the switch, the left boom will stop moving and it will remain in position. Use this function to raise the tip of the boom to clear obstructions.

b. **Boom Up/Down:**
This spring-loaded-to-neutral-center toggle switch controls the boom height cylinder. Move the switch up and hold to raise the entire boom assembly. Move the switch down and hold to move down. Release the switch, the boom will stop and remain at that position.

c. **Right Boom Tilt Position:**
This spring-loaded-to-neutral-center toggle switch controls the right boom tilt function. Move the switch up and hold to raise the tip of the right boom and down to lower. Release the switch, the right boom will stop moving and it will remain in position. Use this function to raise the tip of the boom to clear obstructions.

d. **Main Wing Switch:**
Field to Transport:
This spring-loaded-to-neutral-center toggle switch controls the feild to transport function. Move the switch up and hold to pivot the outer boom to transportin and down to feild position. Release the switch, the flip wing will stop and remain at that position.

IMPORTANT

Extend the cylinder completely when folding the outer boom to allow the boom to rotate till it hits the stop.

e. **Flip Wing Switch:**
This spring-loaded-to-neutral-center toggle switch controls the flip wing fold function. Move the switch up and hold to fold the flip wing in and down to fold out. Release the switch, the flip wing will stop and remain at that position.

f. **Hitch Telescope Switch on 9600 Series 80-100'**
This spring-loaded-to-neutral-center toggle switch controls the telescoping tongue. Move the switch up to extend the hitch for road transport before folding in main wings into transport position. Move switch down to retract hitch after main wings are in field position.

Swing Wing on 9500 Series 120 & 132'
This spring-loaded-to-neutral-center toggle switch controls the swing wing. Move the switch up to fold the swing wing for road transport. Move the switch down to fold out the swing wing for field position

5. **Circuit Diagram:**
The valves in the chemical circuit are used when filling, washing/ rinsing or operating the sprayer. Refer to Section 4.10 to determine how the valves should be set.
1. Main Sump
2. Bottom Fill
3. Pump Intake
4. Wash
5. Agitation
6. Main Tank Rinse Tank
7. Rinse Tank Fill

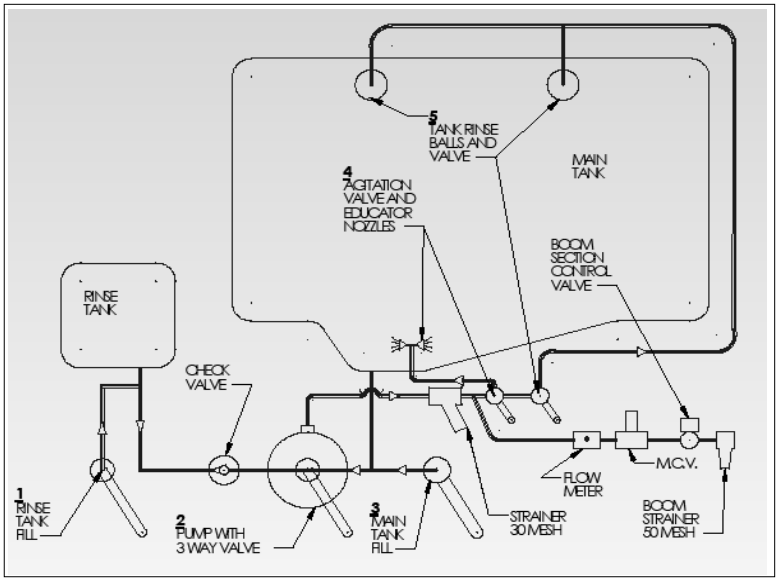


Fig. 7 CHEMICAL CIRCUIT

6. **Chemical Circuit Valves:**
The chemical circuit is designed with 3 or 4 valves for controlling and directing the flow of fluid in the circuit. Refer to Section 4.10 to determine how the valves should be set.

(3 on 60 and 90)
(4 on 80,88,100 **shown**)
(4 on 120)
(6 on 132)

Fig. 8 CIRCUIT VALVES

7. **Eductor Tank (Optional):**
The optional eductor tank system is designed with drain and rinse valves. Use as appropriate when adding chemcial through this tank.

Fig. 9 EDUCTOR TANK

NOTE

See page 45 Operational Instructions.

8. **Hand Wash Tank:**
   A hand wash tank (a) is mounted on the right side of the rinse tank. Open the spigot (b) by the ladder to access the clean water.

9. **Chemical Circuit Pressure Gauge:**
   The chemical circuit of each machine is equipped with a pressure gauge (c)that is attached to the front rinse tank support and visible to the operator. Use it to monitor the chemical circuit pressure.

10. **Chemical Rinse System:**
    Each machine is equipped with a 100 gallon rinse tank on the front of the frame to provide a supply of clean water for rinsing or washing the chemical circuit. Rotating wash heads (d) are plumbed into the top of the tank to clean the inside of the tank.

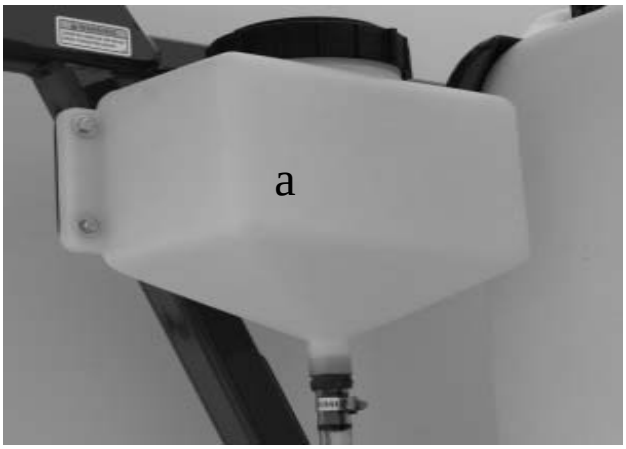


Fig. 10 WASH TANK

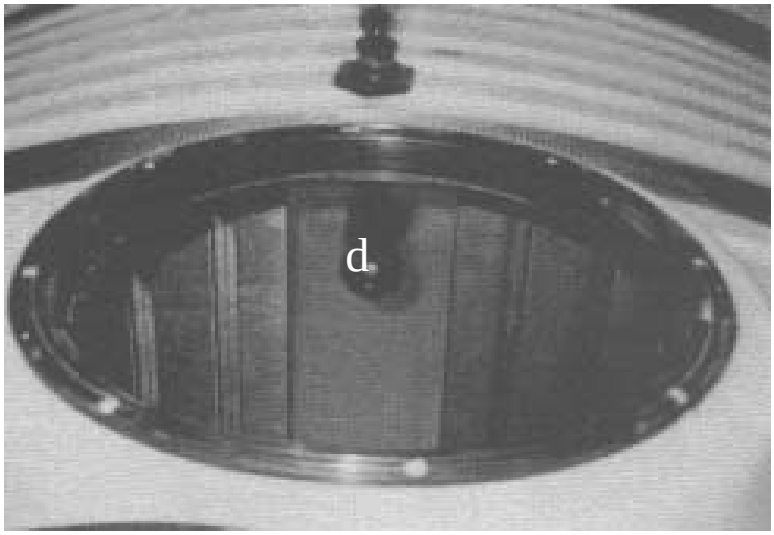


Fig. 11 WASH HEAD(S)

11. **Foam Marker Systems (Optional):**
Each machine can be equipped with an optional foam marker system. Install the controller in the tractor cab within convenient reach by the operator. Mount the solution tank on the right front frame.

A mixing chamber on each boom mixes air with the solution to create the foam.

Direct Injection Foam Concentrate Tank

Mixing Chamber is mounted on flip wing

Fig. 12 FOAM MARKER (Optional)

4.7 INSTALLING CONTROLLERS

A chemical circuit sprayer control box, a boom position switch box and foam marker toggle switch should be mounted in the tractor cab.

1. **Chemical Circuit Control Box:**
   The control box is equipped with a "U" bracket secured by knobs on each end of the box. It provides a universal mounting system adaptable to any configuration.

   Use the two holes provided in the bracket to mount to the box to a solid surface. Position the box to face the operator and tighten the knobs to hold the box in position.

   Cut the power cable to the required length. Connect the white wire to ground and the red wire to a 12 volt battery or 12v power port. Refer to Controller Manual. Panel fuse is a AGC-15 amp.

Fig. 13 CONTROLLER (TYPICAL)

IMPORTANT

Do not connect across a 24 volt system. It will damage internal electrical components.

2. **Boom Position Switch Box:**
   Mount the box next to the sprayer controller to allow easy access. Connect to 12 volt power port. Box fuse is a AGC-10 amp.

   Plug the wiring harness from the trailer into plug on pigtail that comes from boom position switch box. Making sure to properly index connector.

Fig. 14 BOOM POSITION SWITCH BOX
9500 Series 60-100' shown

3. **Optional Foam Marker Switch:**
   Mount the switch next to the boom position switch box to allow easy access from the seat. Be sure to install the switch so that moving to the left activates the left marker. Connect the short wire to a 12V 30 amp power source. Secure with a strap, tape, plastic ties or magnet.

Fig. 15 FOAM MARKER

4.8 ATTACHING/UNHOOKING TRACTOR

Follow this procedure when attaching the sprayer to the tractor:

1. Make sure that all bystanders, especially small children, are clear of the working area.

2. Make sure there is enough room and clearance to safely back up to the sprayer.
   On units with telescoping hitch's, make sure there is clearance between cab and
   end of wings.

3. Use the jack on the frame to raise the frame to align the hitch with the tractor drawbar.

4. Slowly back the tractor until the jaws on the hitch and drawbar bar are aligned.

5. Install the drawbar pin and the retainer.

IMPORTANT

The attaching system must use a clevis on the tractor or the sprayer hitch. Install and secure the sprayer hitch lower clevis support if attaching to a straight drawbar. Remove support if the tractor drawbar forms a clevis.

Tractor clevis system

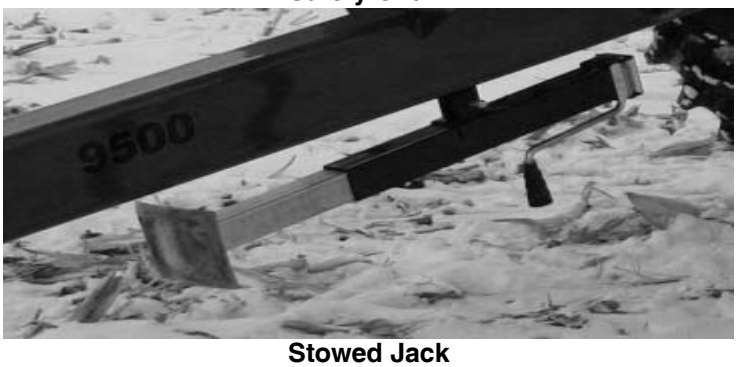
Sprayer clevis hitch

Fig. 16 CLEVIS

6. Retract jack, remove and stow under the hitch frame.

7. Attach the safety chain to the drawbar cage to prevent unexpected separation.

Safety Chain



Stowed Jack

Fig. 17 JACK AND SAFETY CHAIN

8. **Connect the hydraulics:**

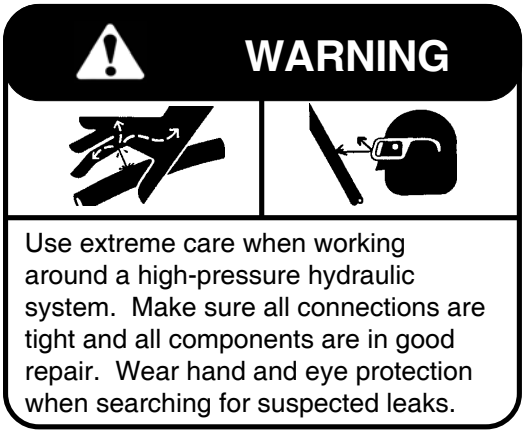
   a. Use a clean rag or paper towel to clean the dirt from couplers on the hose ends and the tractor.

   b. Hook up spray pump hydraulic lines so that when shutting pump off you can go directly into float without going through the neutral detent position on the tractor hydraulic valve control. (Protects impeller keyway and shaft)

      Hook up hoses for fold the block in the same manner.

   c. Route and secure the hoses along the hitch with clips, tape or plastic ties to prevent binding and pinching. Be sure to provide slack for turning.

Fig. 18 HYDRAULIC HOSES



9. Connect the wiring harnesses between tractor and the sprayer. Route the harnesses along the hitch to prevent snagging. Be sure to provide slack for turning.
   A. Use of **Dielectric** grease is recomended on the Raven electrical harness pins before connection. It displaces moisture on the contacts and helps prevent corresion from forming on pins, sockets, leading to erratic function of the auto rate system.

Lights

Controllers

Fig. 19 WIRING HARNESSES

10. Be sure the caddy frame is level. Adjust the hitch clevis as required to level the frame.

11. Reverse the above procedure when unhooking tractor. Be sure to place blocks under the jack if on soft ground.

Fig. 20 LEVEL FRAME

4.9 SPRAYER CALIBRATION

A sprayer can only apply the proper amount of chemicals when each component in the system is functioning properly. Chemical action in the field is dependent upon the accurate application of minute amounts of the spray compound. A complete calibration of the machine is required at the start of each season or when changing chemicals during the spray season.

Disassembled

Single Triple Quad Quint

Fig. 21 NOZZLES (TYPICAL DRY BOOM)

It is the responsibility of the customer to determine the amount of chemical that they want to apply for their particular application. Many factors affect how much chemical is applied such as: nozzle flow rate, chemical circuit pressure, pump speed, ground speed to name a few. In this section, instructions are given on how to accurately determine flow rates or application rates and how to change them. It is recommended that this procedure be followed carefully so you know exactly how much chemical is being applied.

Work closely with your chemical supplier, nozzle manufacturer and pest control specialists to equip and operate your machine to obtain the best results. Several nozzle types are available for the sprayer. Use the type appropriate for your application.

Wet Boom Triple & Single

4.9.1 ENGINE RPM

Although the exact value of the engine speed is not particularly important to sprayer function, it is recommended that it always be set at 2/3 or more throttle position. This will insure that there will be sufficient oil flow through the hydraulic system and sufficient power to maintain the ground speed.

Select the desired engine RPM and always perform the calibration and run in the field at the same setting.

4.9.2 CONTROLLER CALIBRATION

The controller must be set and calibrated for your specific machine. Refer to the Controller manual and follow its Calibration procedure. Use the same controller settings during sprayer component calibrations as used in the field.

The automatic controller will adjust the chemical circuit to provide for a uniform application rate when ground speed changes up to + 20%. However the system must be calibrated to determine the application rate at the nominal starting point.

4.9.3 NOZZLE CALIBRATION

Consult your dealer or the factory to determine the type of nozzles on your machine and their specific nominal flow rate. To determine or set the application rate, the flow rate of solution through the nozzles must be known. Operate the tractor at the same RPM and hydraulic setting as if running in the field. Start with the chemical circuit pressure at 20 psi. Increase or decrease pressure as required to obtain desired flow rate.

1. Remove all the nozzles from the sprayer.

2. Use clean water to wash each nozzle and clean the check valve.

3. Reinstall the nozzles in the booms.

IMPORTANT

Never calibrate nozzles with active chemical in the tank. The solution can contaminate workers, the workplace and the environment.

4. Add clean water until the tank is 1/2 full.

5. Place a calibration cup under all the nozzles on each boom.

NOTE

Calibration cups are available from most agricultural offices or weed supervisors.

6. Run the tractor at the RPM selected in Section 4.9.1. Operate the chemical circuit pump at the desired pressure and measure the time that it takes to spray a quart or liter through each nozzle.

IMPORTANT

If the Controller cannot produce the required pressure in the chemical circuit, decrease the agitation flow to reset the system and try again.

Use Table 2 to determine flow rate for the nozzle.

Table 2 Nozzle Flow Rates

U.S. Gallons		Imperial Gallons		Metric	
Time Time/qt min:sec	Flow Rate fl. oz./min	Time Time/qt min:sec	Flow Rate fl. oz./min	Time Time/liter min:sec	Flow Rate m Liter/min
6:24	5.0	8:00	5.0	7:00	143
6:40	4.8	8:20	4.8	7:18	137
6:57	4.6	8:42	4.6	7:38	131
		8:53	4.5	7:45	129
7:07	4.5			7:56	126
7:16	4.4	9:05	4.4		
7:37	4.2	9:31	4.2	8:20	120
				8:46	114
8:00	4.0	10:00	4.0		
8:25	3.8	10:32	3.8	9:10	109
8:53	3.6			9:43	103
		11:07	3.6		
9:09	3.5	11:26	3.5	10:00	100
9:25	3.4	11:46	3.4	10:19	97
				10:59	91
10:00	3.2	12:30	3.2		
10:40	3.0			11:38	86
		13:20	3.0		
11:26	2.8			12:30	80
		14:17	2.8		
12:18	2.6			13:31	74
12:48	2.5	15:23	2.6		
				14:05	71
13:20	2.4	16:00	2.5		
		16:40	2.4	15:30	69
14:32	2.2			15:52	63
		18:11	2.2		
16:00	2.0			16:33	57
		20:00	2.0		

7. Replace all nozzles giving more than 10% above the nominal flow rate.

8. Reclean all nozzle components from nozzles 10% below the flow rate and then recheck.

NOTE

Measuring the flow rate for each nozzle will insure a consistent and uniform spray pattern across the entire machine.

4.9.4 MACHINE YARD CALIBRATION

After the nozzles have been calibrated, it is recommended that the entire system be calibrated. A yard run is the simplest method to determine total volume delivered. To calibrate in the yard, follow this procedure:

1. Fill the tank full of water (no chemicals).

2. Check that all screens are clean.

3. Set the chemical system and boom pressure to the desired value and run the tractor at the selected engine RPM.

4. Spray in a stationary position for a known period of time.

5. Refill the tank and measure accurately the amount of water used.

6. This will give the amount of spray used per time.

The total volume can be changed by increasing or decreasing the chemical system pressure. However if a change is made, it is recommended that the entire system be calibrated again to determine the new volumes.

4.9.5 GROUND SPEED CALIBRATION

For optimum spraying results, it is important to maintain a known constant speed to spray the required chemical over a given area. Because of wheel slippage, the operator cannot rely on the tractor speedometer reading to give the value of true ground speed. The unit must be timed over a known distance to determine true ground speed. To calibrate, follow this procedure:

1. Mark off distance of 100, 200 or 300 feet in the field to be sprayed (longer distances provide greater accuracy).

2. Place the tractor in the gear to give a speed between 6 and 8 mph (9.5 and 13 kph) and at the selected engine RPM.

3. With the tank 1/2 full of water, drive the tractor and sprayer through the measured distance.

4. Record the time required to travel the measured distance.

5. From Table 3 determine the actual tractor speed. You can shift gears to change speed but it is recommended that you go through the measured distances again to determine true ground speed when using the manual controller.

IMPORTANT

Always operate at the engine RPM determined in Section 4.9.1.

6. If the machine is equipped with the automatic controller, the ground speed can be changed by up to 20% without acquiring adjustments. However, do not decrease the throttle below its 2/3 setting.

Table 3 Ground Speed Calibration

Speed mph	Time In Seconds To Travel 100 ft.	200 ft.	300 ft.	Time To Travel 1/2 mile minutes:seconds
5.0	13.6	27.3	40.9	6:00
5.4	12.6	25.3	37.8	5:33
5.6	12.2	24.4	36.5	5:21
5.8	11.8	23.5	35.3	5:10
6.0	11.4	22.7	34.1	5:00
6.2	11.0	22.0	33.0	4:50
6.4	10.7	21.3	32.0	4:41
6.6	10.3	20.7	31.0	4:33
6.8	10.0	20.1	30.1	4:23
7.0	9.7	19.5	29.2	4:17
7.2	9.5	18.9	28.4	4:10
7.4	9.2	18.4	27.6	4:03
7.6	9.0	17.9	26.9	3:57
7.8	8.8	17.5	26.3	3:52
8.0	8.5	17.0	25.6	3:45
8.2	8.3	16.6	24.9	3:40
8.4	8.1	16.2	24.4	3:34
8.6	7.9	15.8	23.7	3:29
8.8	7.7	15.5	23.2	3:25
9.0	7.6	15.2	22.7	3:20
9.2	7.4	14.8	22.2	3:16
9.4	7.3	14.5	21.8	3:11
9.6	7.1	14.2	21.3	3:08
10.0	6.8	13.6	20.5	3:00

Speed km/h	Time In Seconds To Travel 30.5 m	61.0 m	91.4 m	Time To Travel 1 kilometer minutes:seconds
7.0	15.9	31.7	47.6	8:44
7.5	14.8	29.5	43.2	8:08
8.0	13.6	27.3	40.9	7:30
8.5	12.9	25.9	38.7	7:05
9.0	12.2	24.4	36.5	6:41
9.5	11.6	23.2	34.7	6:21
10.0	11.0	22.0	33.0	6:02
10.5	10.5	21.0	31.5	5:46
11.0	10.0	20.1	30.1	5:29
11.5	9.6	19.2	29.2	5:21
12.0	9.1	18.2	27.3	5:00
12.5	8.7	17.5	26.3	4:49
13.0	8.4	16.8	25.3	4:38
13.5	8.1	16.2	24.4	4:27
14.0	7.8	15.7	23.5	4:19
14.5	7.6	15.2	22.7	4:10
15.0	7.3	14.7	22.0	4:02
15.5	7.1	14.0	21.3	3:55
16.0	6.9	13.8	20.7	3:47

4.9.6 AREA COVERED

To determine application rates, it is necessary to know the area covered by the sprayer during one pass. Table 4 gives the area for 7 widths:

Table 4 Actual Sprayer Coverage

Sprayer Width	Acres		Hectares	
	1/2 mile	1/4 mile	1/2 km	1/4 km
60'	3.64	1.82	1.45	0.73
80'	4.85	2.42	1.94	0.97
88'	5.33	2.66	2.13	1.06
90'	5.45	2.73	2.18	1.09
100'	6.06	3.03	2.45	1.22
120'	7.28	3.64	2.90.	1.45
132'	8.00	4.00	3.20	1.60

4.9.7 FIELD CALIBRATION

To verify the application rates in the field, follow this procedure:

1. Fill the tank to the neck with water and mark the level of water.
2. Check that all screens are clean.
3. Set the chemical system pressure to the desired value and run the tractor at the selected engine RPM in the selected gear.
4. Drive through the measured distance while spraying.
5. Refill the tank to the same mark and measure the amount required.
6. Divide the amount of liquid sprayed by the area covered to determine the application rate.

$$\text{Appl. Rate} = \frac{\text{Volume sprayed}}{\text{Area covered}} = \frac{\text{gals (liters)}}{\text{acre (hectare)}}$$

Table 5 Conversions

1 km	0.62 mile
1 ha	2.5 acres
1 g	0.035 oz.
1 kg	2.2 lbs.
1 g/ha	0.014 oz/acre
1 kg/ha	0.88 lb/acre
1 ml	0.035 fl. oz.
1L	0.264 gal (US)
1L	0.22 gal (Imp.)
1L/s	15.85 gpm (US)
1L/s	13.20 gpm (Imp.)
1 kPa	0.145 psi
1 mm	0.04 in.
1 m	3.28 ft.
1 L/ha	0.106 gal (US)/acre
1 L/ha	0.088 gal (Imp.)/acre

4.10 FIELD OPERATION

OPERATING SAFETY

1. Read and understand the Operator's Manual and all safety signs before using.
2. Place all controls in neutral, stop tractor engine, turn monitor off, set park brake, remove ignition key, wait for nozzles to stop spraying before servicing, adjusting, repairing or unplugging.
3. Before spraying a field, be familiar with all potential hazards: trees, rocks, ditches, gullies, etc. Plan the spraying route to avoid hazards. Remember you are driving a wide machine. USE CAUTION WHEN CORNERING.
4. Keep hands, feet, hair and clothing away from all moving and/or rotating parts.
5. Do not allow riders on the sprayer or tractor during operation or transporting.
6. Clear the area of all bystanders, especially children, before starting or filling with water or chemical.
7. Stay away from wing pinch points when folding or extending wings. Keep others away.
8. Stay away from power lines when extending or folding wings. Electrocution can occur without direct contact.
9. Read chemical manufacturers warnings, instructions and procedures before starting and follow them exactly.
10. Do not breathe, touch or ingest chemicals. Always wear protective clothing and follow safe handling procedures.
11. Spray only when potential for chemical drift is at a minimum. Even small amounts can affect neighboring crops or sensitive plants and people.
12. Dispose of chemical containers by triple rinsing them into the sprayer tank or thoroughly rinsing, crushing and delivering to regional disposal site.
13. In case of poisoning, get immediate medical attention.
14. Only rinse sprayer while still in the field. Spray the rinse thinly over the field already sprayed. Never contaminate the farmyard or drainage systems with sprayer rinse.
15. Do not eat in the field when spraying.
16. Before applying pressure to the hydraulic system, make sure all components are tight and that steel lines, hoses and couplings are in good condition.
17. Before applying pressure to chemical system make sure that all connections are tight and that all hoses and fittings are in good condition.
18. Review safety instructions annually.

Follow this procedure when using the sprayer:

1. Attach sprayer to the machine (see Section 4.8).
2. Review and follow the pre-operation checklist (see Section 4.4).
3. Review the location and function of all controls (see Section 4.6).
4. Read and follow chemical manufacturers' instructions.
5. Calibrate the sprayer so you know exactly how much chemical is being applied (see Section 4.9). The application of excess chemicals, even in small amounts, can have detrimental affects. Recalibration at the start of the season or when changing chemicals is a must.
6. Transport the sprayer to the working area (See Section 4.12).
7. Convert into field position (see Section 4.11).

8. After arriving at the field, fill the sprayer.

9. Extend the hose from the supply vehicle or pump to the sprayer. Water can be added through the top lid or bottom fill fitting.

Fig. 22 TOP FILLING

IMPORTANT

It is recommended that the water supply system be equipped with a pump for transferring water.

10. **To top fill:**

    a. Place the water hose into the top lid, start the pump on the supply vehicle and run until the tank is full. Stop the pump, remove hose and close the lid.

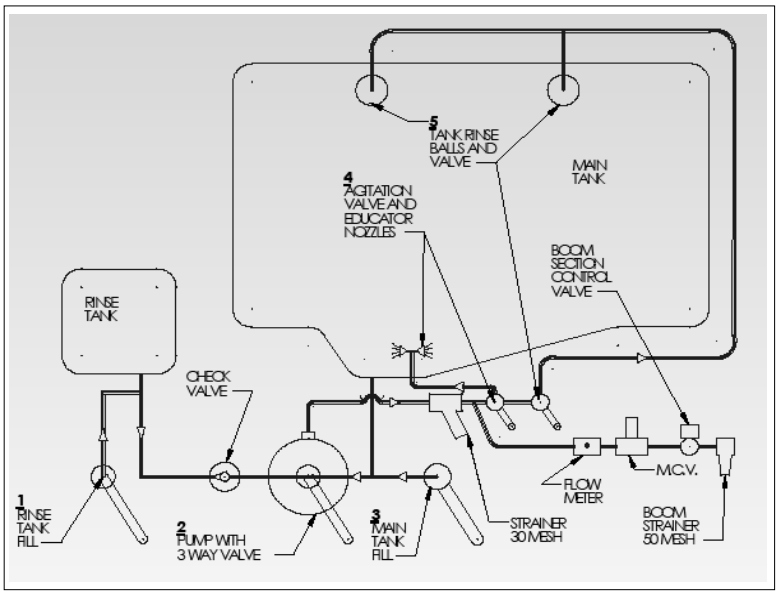


Fig. 23 CHEMICAL CIRCUIT

IMPORTANT

Be sure the water is clean. Clean water is necessary to prevent screen and check valve plugging.

    b. Do not run pump until the tank is 1/4 full of water. Water is required in the pump to cool the seals. A head of water is required to keep the pump primed. Be sure the booms are turned off.

    c. Run in the circulate mode for at least 5 minutes to thoroughly mix the solution before starting.

IMPORTANT

If pump is not primed, stop immediately and bleed the air out of the pump.

DANGER

1. Wear rubber gloves, eye protection and protective clothing whenever handling chemicals.

2. Do not breathe vapor or ingest chemicals and avoid contact with exposed skin.

3. Follow chemical manufacturers' instructions.

11. **To bottom fill:**

    a. Remove cover on bottom fill fitting, attach hose and secure with cam-locks.

    b. Open Valve 2 to allow the flow of water into the tank. Valve 6 handle toward pump. Open agitation Valve 5, 1/3 open. Adjust as required.

    c. Open the valve at the supply vehicle, start the supply source pump and fill the sprayer.

    d. Start the sprayer pump to circulate water through the system.

Fig. 24 BOTTOM FILL

IMPORTANT

Be sure the water is clean. Clean water is necessary to prevent screen and check valve plugging.

IMPORTANT

Do not start the sprayer pump until the water from the supply vehicle has started to flow. Water is necessary to cool and lubricate the pump seals. Without water, the seals will fail in a few minutes.

e. While the tank is filling, add the chemical.

i. Start the sprayer pump for agitation.

ii. Add the chemical through the top lid, the eductor tank on the water supply vehicle or the optional eductor tank on the frame.

IMPORTANT

The sprayer pump must be running to circulate the solution in the system and provide agitation.

iii. Open Valve A then valve B under the eductor tank line, to draw the chemical into the system.

iv. Close Valve B then A, when the eductor tank is empty.

v. Triple rinse each chemical container when empty.

vi. Repeat with the next container until all the chemical has been added.

vii. Discard used containers at your nearest container disposal site.

viii. Triple rinse the eductor tank and draw into the main tank using valve A.

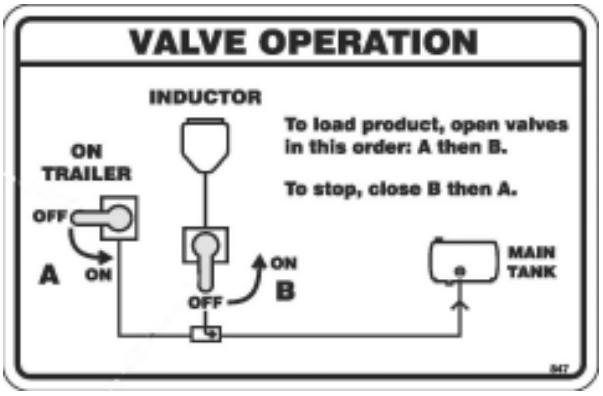
DANGER

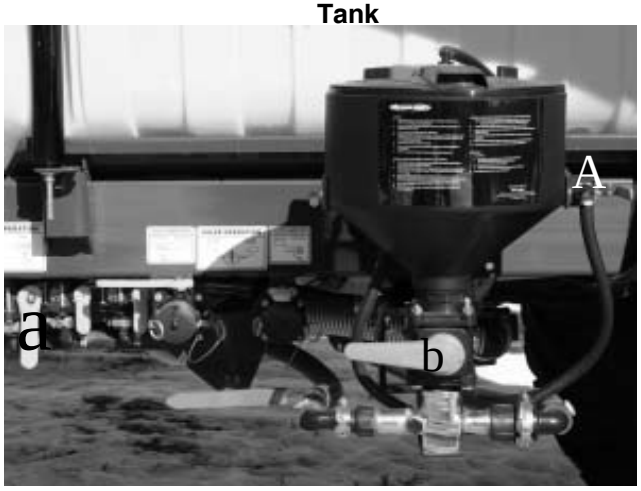
1. Wear rubber gloves, eye protection and protective clothing whenever handling chemicals.
2. Do not breathe vapor or ingest chemicals and avoid contact with exposed skin.
3. Follow chemical manufacturers' instructions.

WARNING

1. Do not burn chemical containers as toxic fumes could contaminate the area.
2. Do not discard chemical containers in ditches.
3. Do not place containers in landfills.
4. Dispose at nearest container disposal site.

Tank





Valves

Fig. 25 EDUCTOR TANK

f. When the tank is full, close Valve 2 at the sprayer, close valve at the supply vehicle and stop the pump on the supply vehicle. This will prevent back flushing from the sprayer.

g. Disconnect the water hose and secure the cap.

h. Run the pump to allow the solution to circulate. Mix for 2 minutes before starting to spray.

i. Move the supply vehicle out of the way.

Fig. 27 AUXILIARY TANKS

12. Fill the auxiliary tanks as required.

    a. 3 gal. Hand Rinse
    b. 100 gal. Sprayer Wash Tank
    c. Optional Foam Marker

13. Although well water is recommended, surface water can be used if it is thoroughly filtered. Be sure to keep the filters clean when using this method.

14. If using wettable powders, remove the top tank lid and slowly add the powder. Be sure the tank is at least 1/2 full of water and the pump is running.

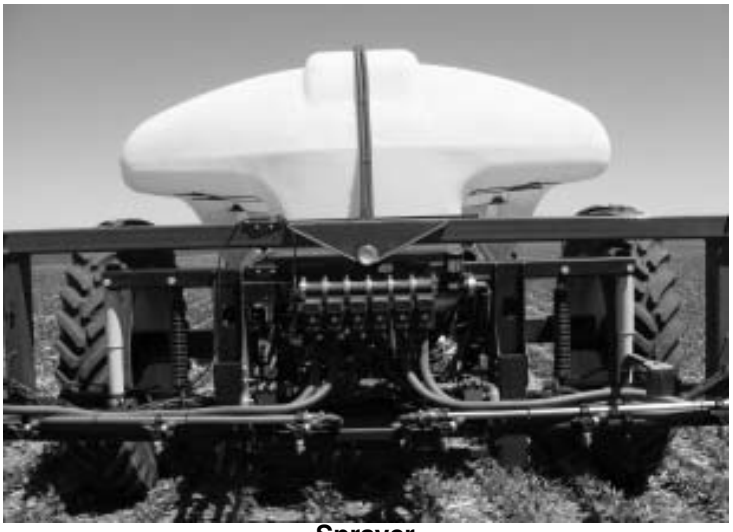
    If the powder is not added slowly, clumps of powder will be drawn into the suction line and plug the screen in the filter.

IMPORTANT

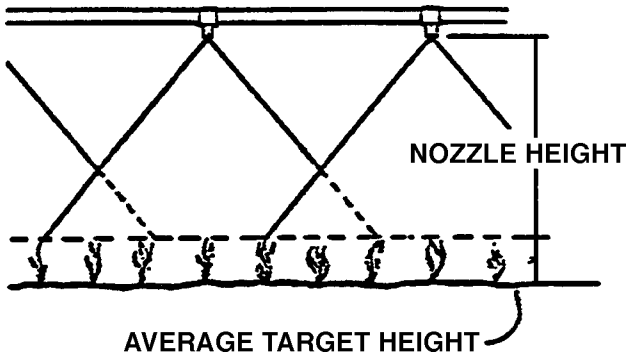
It is recommended that the wettable powder be pre-mixed in hot water before adding to the sprayer. This prevents clumps from plugging the filters. Triple rinse the mixing container when it is empty.

15. If foaming occurs, add an anti-foaming additive to the tank.

16. **Nozzle Height (Broadcast):**
    The nozzle is adjustable from 17 to 72 inches (500 to 1750 mm dependant on tire size). Set the height so the spray pattern from the nozzles overlap a couple of inches above the crop canopy or plants.



Sprayer



Diagram

Fig. 28 NOZZLE HEIGHT

17. **Travel Speed:**
    Crop and plant type will determine the travel speed for spraying.

    a. **Cereal crops - broadcast planting:**
    A travel speed of 6 to 12 mph (9.7 to 19. Km/ hr) is recommended for most operating is appropriate for the conditions.

    b. **Row Crops:**
    A travel speed of 5 to 10 mph (8.1 to 16 Km hr) is recommended in row crops. For crops that have a dense foliage canopy, a slower speed gives more time for the spray to open the plant canopy and allow the chemical to get inside and coat the underside of the leaves. However operate at a speed that is appropriate for the conditions.

18. **For broadcast spraying:**
    It is recommended that the operator make one pass around a field to start and then spray back and forth to obtain the best results. Using a marker system helps to prevent skips or overlap.

    If your field has headlands, be sure to allow sufficient space for turning.

19. For row crop spraying, start at one edge of the field and go back and forth until the field is completed.

20. Be sure the sprayer is calibrated, the nozzle height and pressure are known and the tractor gear and RPM are determined before starting to spray (see Section 4.9).

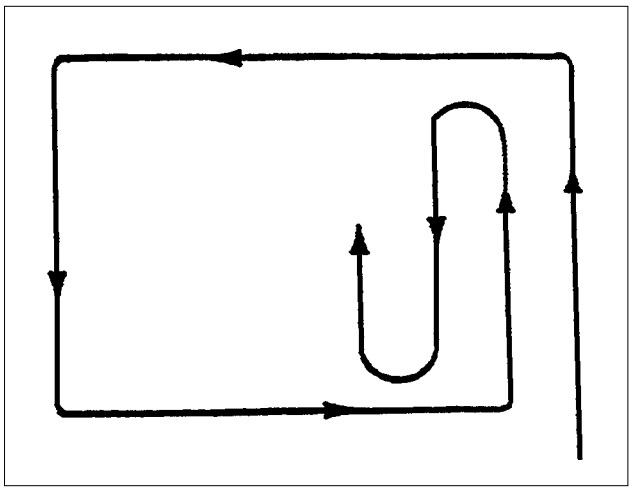


Fig. 29 TRAVEL PATTERN (BROADCAST)

21. Proceed down the field at a constant speed. Use the selected gear, engine RPM and ground speed determined during the calibration of the machine application rate.

22. Place the Master Boom switch in the OFF position and the appropriate Boom switches in the ON position.

23. Turn the booms ON with the Boom Master switch as the nozzles pass over the edge of the already sprayed headland and come to the area to be sprayed. Use the individual boom switches as appropriate when finishing a field.

24. When completing a pass and approaching the sprayed headland, maintain the tractor RPM and ground speed until the nozzles have covered all the plants. This will insure a consistent application rate at the ends of the field.

Fig. 30 CONTROL BOXES (TYPICAL)

Fig. 31 SPRAYING

25. **Boom Tilt:**
Each side of the boom is equipped with a tilt cylinder that allows the operator to tilt the individual boom up at the ends of the field or whenever required to clear obstacles.

Right

Fig. 32 BOOM TILT CYLINDERS

26. **Boom Break-Away:**
Each boom is designed with a break-away hinge between the outer booms and the boom extention. Each of these hinges will break-away when the boom strikes an obstruction to prevent damaging the boom.

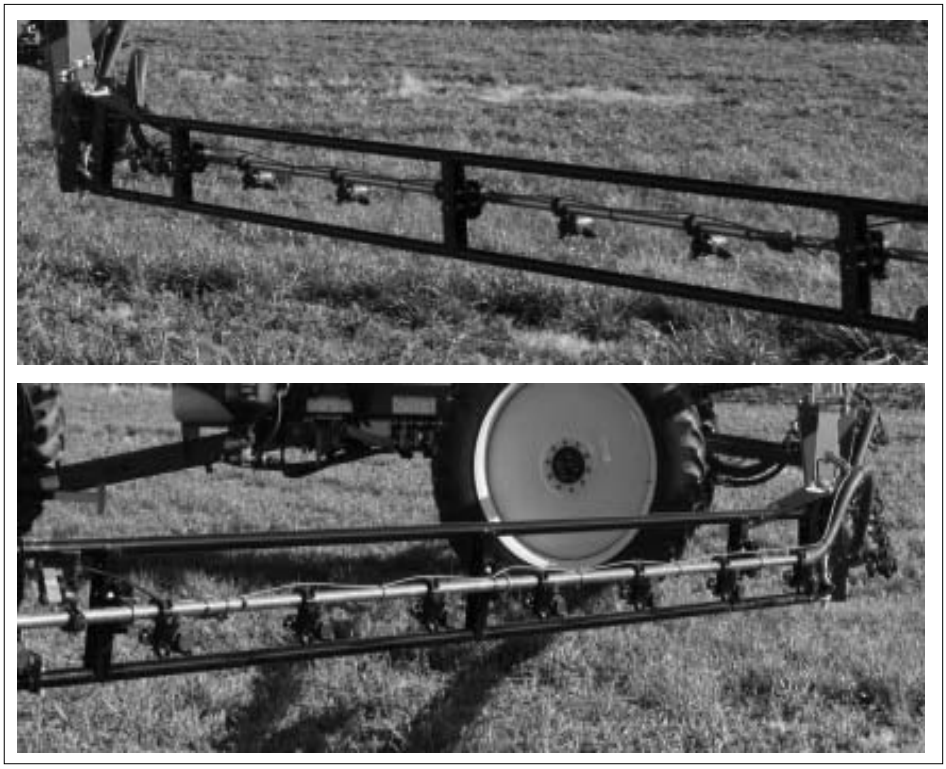


Fig. 33 BOOM BREAK-AWAY

IMPORTANT

The 120-132' units are shipped from the factory with a lock bolt through the hinge mechanism. Always remove lock bolt before starting to use in the field.

27. **Wheel Spacing:**
Axles on the machines are adjustable to provide tire spacing of 80,88 and 120 inches. Loosen the axle bolts and reposition axle to give the desired spacing. 62" wheel track is available by finish cutting out of knockout. Use caution when operating machine at 62" wheel track as center of gravity and stability has changed.Other spacings are available from the factory upon request.

Fig. 34 ADJUSTABLE AXLE

28. **Valve Settings:**
The chemical circuit is designed with 5 valves: 4 valves are open and closed; and 1 is a three way. 2 open and closed valves are used with the optional eductor tank system.

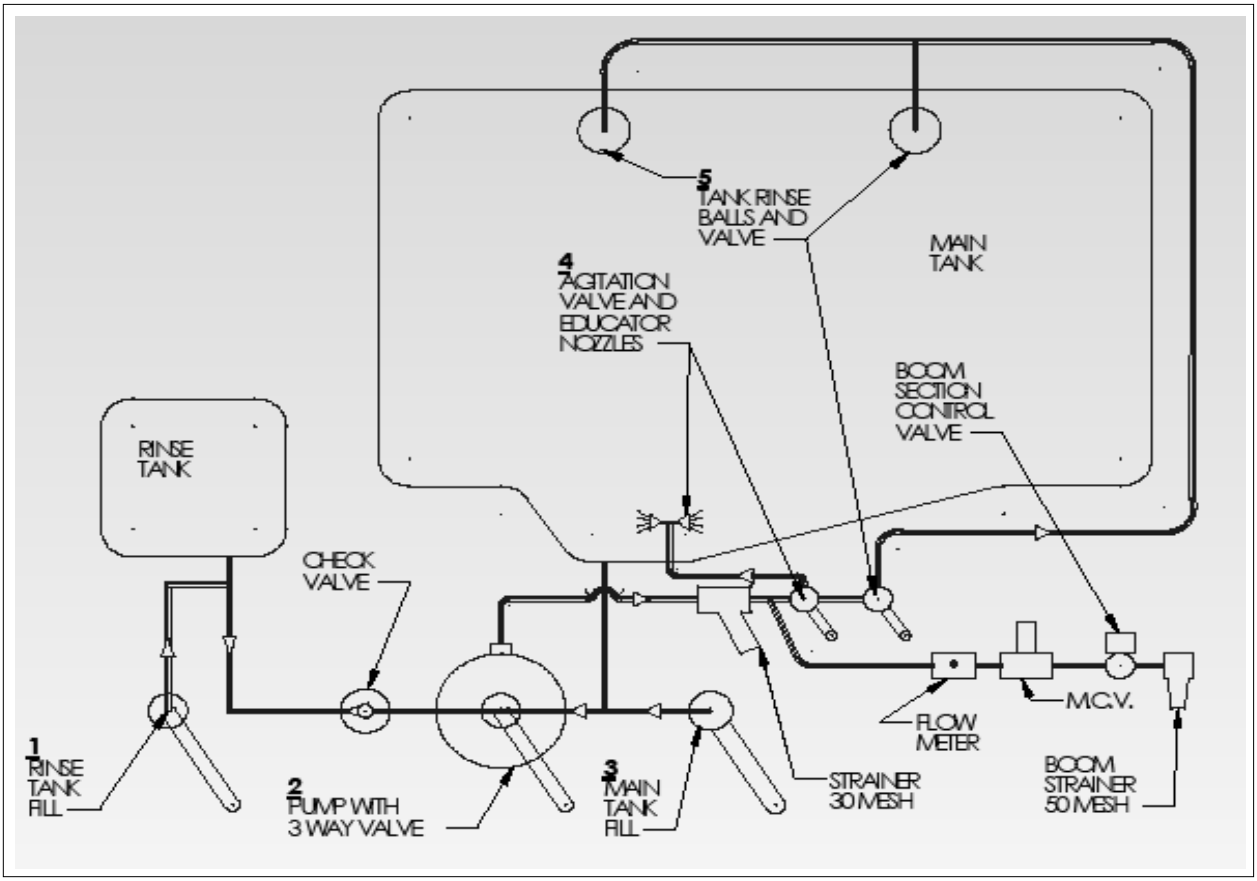


Fig. 35 CIRCUIT DIAGRAM

a. **Agitation:**
The front valve controls the agitation circuit. Move the handle at right angles to the line to stop the agitation. Move the handle parallel to the line for maximum agitation.

It is recommended that the handle be set to provide partial agitation to the system during operation. Provide higher rates of agitation if using powders.

b. **Rinse:**
The second valve controls the tank rinse circuit. Move the handle parallel to the line to turn the tank rinse or wash circuit on. Move the handle at right angles to the line to turn the rinse circuit off.

c. **Rinse Tank Fill:**
This valve controls the flow of water into the front 100 gallon rinse tank. Move the handle parallel to the line to fill the rinse tank and at right angles to stop. Watch closely when filling the rinse tank as it only holds 100 gallons.

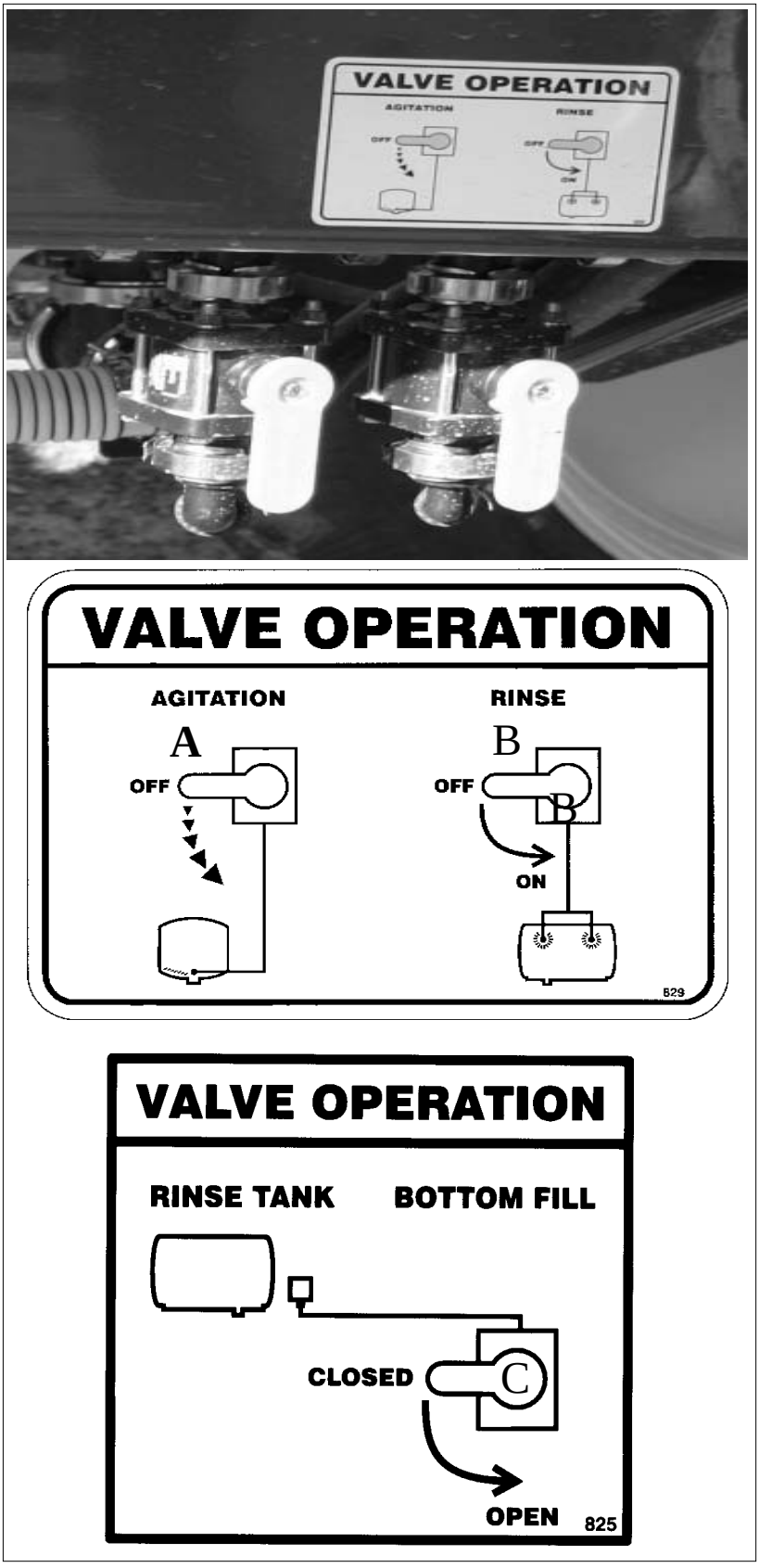


Fig. 36 VALVE OPERATION

d. **Suction Line Valve:**
This 3 position valve controls the flow into the pump. Point the arrow to the left to draw water from the front rinse tank. Point the arrow down to close the suction line and stop the flow into the pump. Point the arrow to the right to draw solution from the main tank.

IMPORTANT

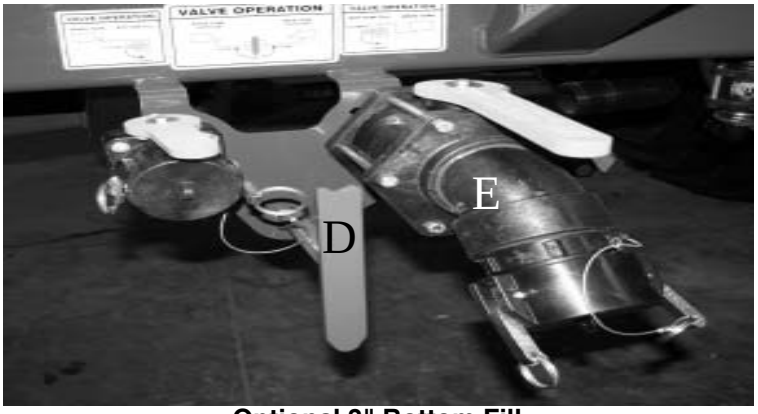
Always turn the pointer toward the rinse or main tank before starting the pump. The pump must have solution flowing through it to cool the seals. It is recommended that the valve be turned to the main tank unless rinsing the system to minimize the chance of damaging the pump seals.

e. **Bottom Fill Main Tank:**
This valve controls the flow of water into the main tank. Turn the handle parallel to the line to direct the flow of water into the main tank. Turn the handle at right angle to the line to stop the flow. Always close the valve when not filling the tank.

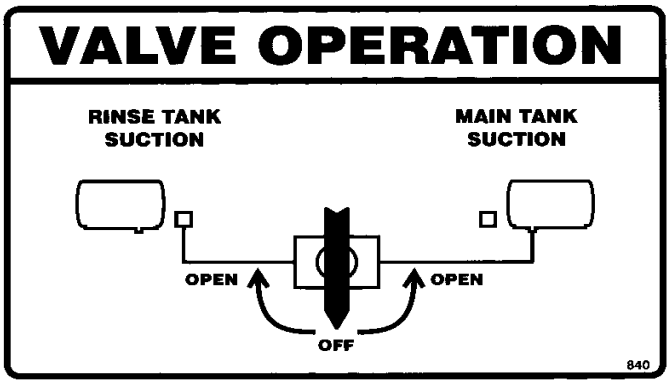
NOTE

An optional 3 inch intake line is available to allow for faster filling.

2" Bottom Fill



Optional 3" Bottom Fill



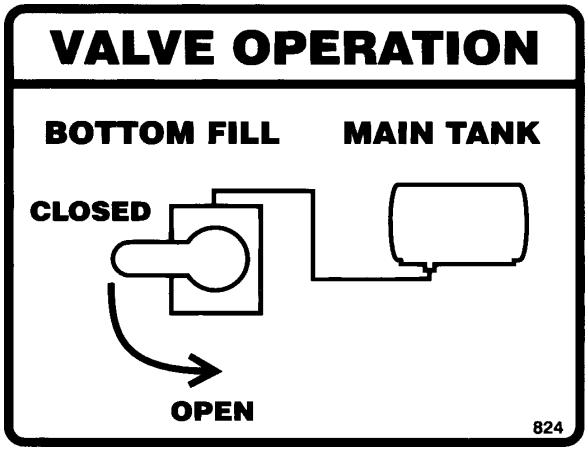


Fig. 37 BOTTOM FILL VALVE

f. **Eductor Valves:**
These 3 valves control the operation of the Hypro Cleanlod eductor system.

The upper valve (C) is used to rinse or flush the eductor tank and the bottom valve to empty it. Turn the handle parallel to the line to open the line(s) for rinsing or emptying the eductor tank. Turn the handle to right angle to the line to turn it off. Always triple rinse the tank after adding chemicals.

g. **To Load:** product into main tank
Open A, then B

h. **To Shut Down:**
Close B, then A

Valves

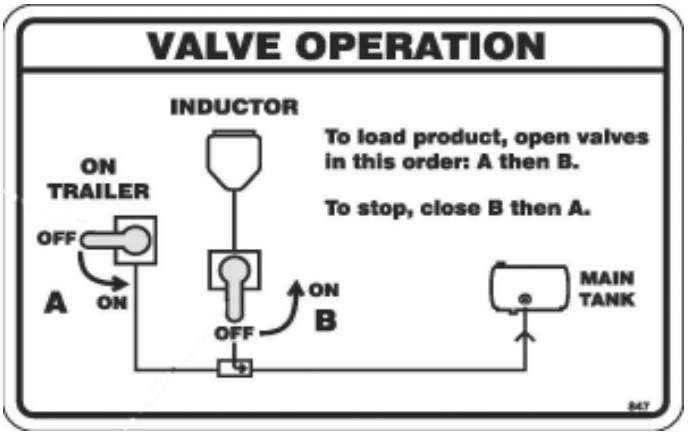


Fig. 38 EDUCTOR SYSTEM

29. **Rinse Tank:**
The machine is equipped with a 100 gallon rinse tank on the front of the frame. It should be used at the end of each working day to flush out the pump and booms to prevent corrosion. Or use it to flush out the system prior to performing any maintenance work on the machine. Refill the tank again with clean water when refilling the main tank.

Fig. 39 RINSE TANK

30. **Fence Row Nozzle:**
The sprayer is equipped with a fence row circuit to provide coverage next to a fence or the edge of a field. Open the valve in the line when spraying next to a fence. Turn the valve off when spraying in the field.

Standard Manual Valve

Optional electric shutoff valve

Fig. 40 FENCE ROW CIRCUIT

31. **Norac Auto Leveling System (Optional):**
The sprayer can be equipped with an "auto norac" leveling system. The control valve is mounted on the back of the frame and connects into the hydraulic system to keep the booms level.

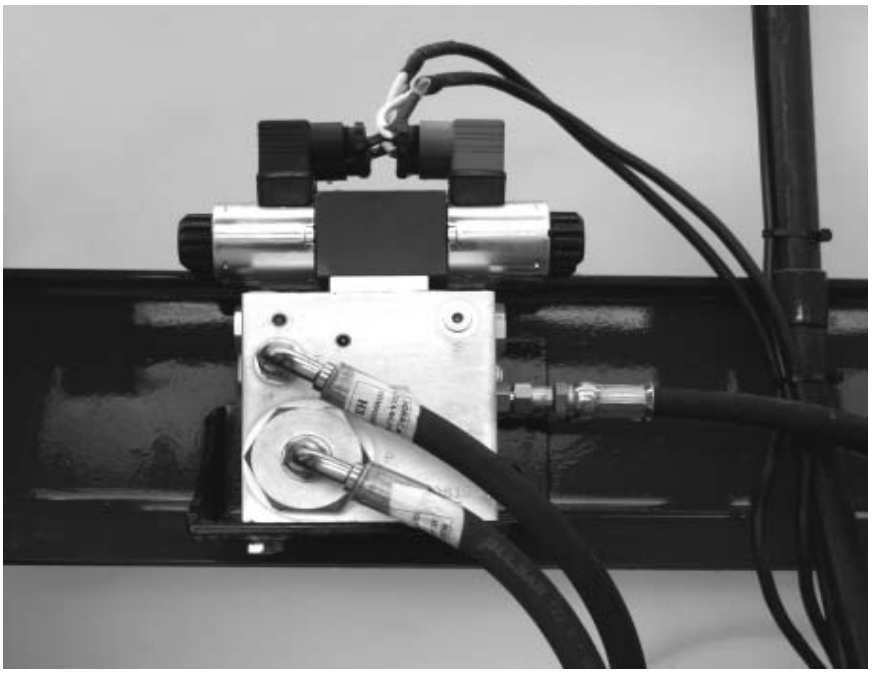


Fig. 41 NORAC AUTO LEVELING VALVE

32. **Pesticide Hazards:**
Extreme care must be taken when working around chemicals. Be familiar with the toxicity levels of the chemicals you are using and recommended protective gear that each operator should use before starting.

A. **Toxicity Levels:**
Every pesticide container has a label on it that designates its level of toxicity. This toxicity level then requires the operator to use specific protective gear whenever working with this chemical.

Toxicity Level	Protective Gear
DANGER POISON	Goggles, Respirator, Gloves and Skin Protection. AvoidFumes.
WARNING POISON	Goggles, Gloves and Skin Protection. AvoidFumes.
CAUTION POISON	Gloves and Skin Protection. AvoidFumes.

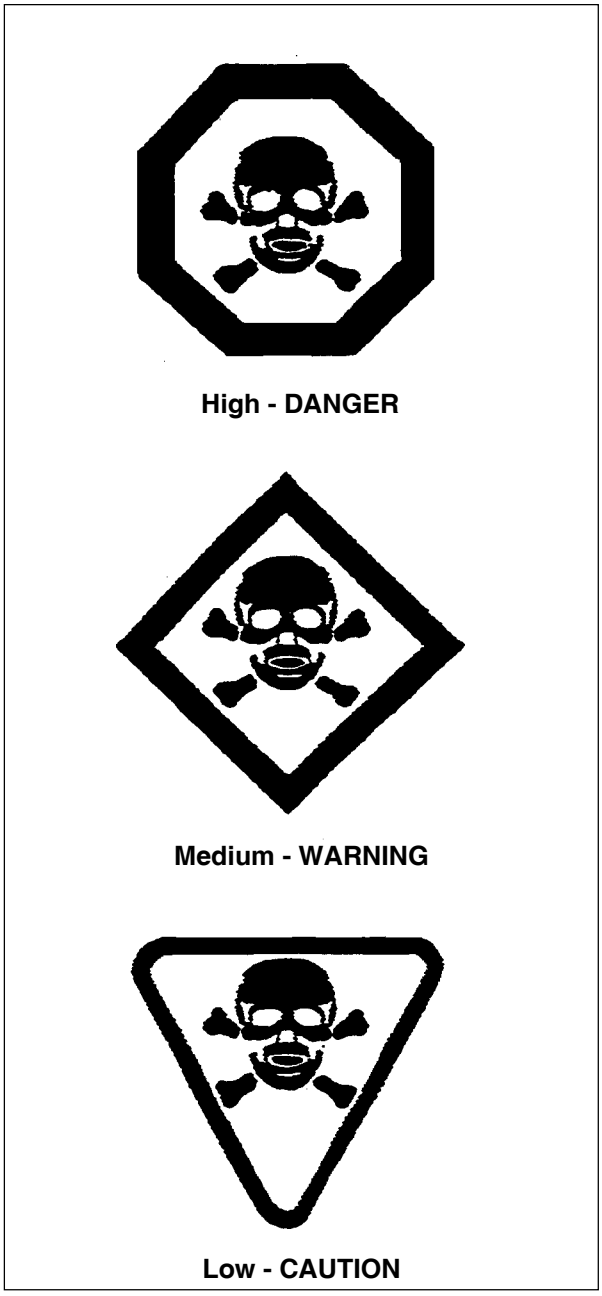


Fig. 42 TOXICITY LEVELS

B. **Personal Protection:**
To reduce or eliminate contact with herbicides, it is necessary to wear adequate protective clothing, respirators, boots, goggles and gloves. The use of this equipment is essential for good health especially when applying some of the more toxic herbicides.

a. **Respirators -** Protection against inhalation (but no skin contact) is provided quite economically by the use of face mask respirators. Choose a mask that will fit your face and check with the company about the details of filters and chemical cartridges used in the respirator model. Note that full and half face masks cannot be worn securely by men with beards, whiskers, sideburns and moustaches. Instructions on the operational life and performance of filters and cartridges generally accompany the products. However, when carrying out spray operations, it is wise to change the filters each day and the cartridges should be replaced when chemical odour is noticed. Wash the face mask with warm water and soap before installing a new cartridge and filter. Do not store cartridge and filters in the chemical storage area, as they can absorb the chemical even when not in use.

b. **Goggles -** When a full mask is not worn, the use of protective goggles is necessary and is recommended to protect the eyes from pesticide vapour, solids, and accidental splashes particularly. Safety supply companies offer a range of goggles. Many goggles are resistant to chemicals, some have specially treated lenses to reduce fogging, others have anti-fogging ventilation. Prescription type glasses are also available to which side shields can be attached.

c. **Gloves -** Non-absorbent gloves should be worn at all times when handling, mixing and applying pesticides. Neoprene has been found to be superior to rubber in resisting the penetration of pesticides. Other factors to be considered in selecting suitable gloves include sense of touch, wet grip, and cut and abrasion resistance. Gloves should not have fabric wristbands or lining and should fit properly. Always wash the glove inside and out after use. Leather gloves are not suitable.

d. **Footwear -** Non-absorbent footwear should be worn when applying pesticides. It is suggested that the most suitable boot is one that is knee length, acid and solvent resistant and ribbed to prevent slippage. Neoprene is considered much superior to rubber. Leather boots are not suitable.

e. **Clothing -** For general protection coveralls should be worn, along with gloves and a hat to minimize the hazard of the skin absorbing pesticides. Clothing should be changed and washed regularly following spraying. You can now purchase disposable clothing that provides protection against exposure resulting from pesticide drift, splashing or spills. These garments (overalls, shirts and pants, head cover, and aprons) are light weight and cooler than rubber articles. Protective equipment and clothing are available from safety supply companies. Never use leather garments e.g. jackets, gloves, or shoes during the handling or applications of pesticides. Leather can absorb the chemical and it is very difficult to decontaminate leather articles.

33. **Chemical Application:**

a. **Dilution:** Pest control is dependent upon the application of minute amounts of a toxic substance. This process starts with the proper mixing of the toxic material with water. It is very important that the operator read the mixing and dilution instructions on the chemical container before starting. Combine the chemical and water in the proportions recommended on the container only. Improper mixing can damage the crops or not affect the pests.

b. **Wettable Powders:** It is recommended that wettable powders be pre-mixed in the mixing tank before drawing into the main tank or added very slowly through the top cover. Be sure to allow at least 5 minutes of circulation and agitation before starting to spray. Any clumps or sludge can clog the suction screen or nozzles. Unless you stop and clean the machine, skipping and poor coverage will occur.

34. **Eductor Tank (Optional):**
An optional eductor tank can be mounted on left side of the frame. The tank is locked in the up position for operation and unlocked or lowered when adding chemical. Use the valves into and out of the tank to draw the chemical into the main circuit and to wash out the tank.

NOTE

See page 45 Operational Instructions.

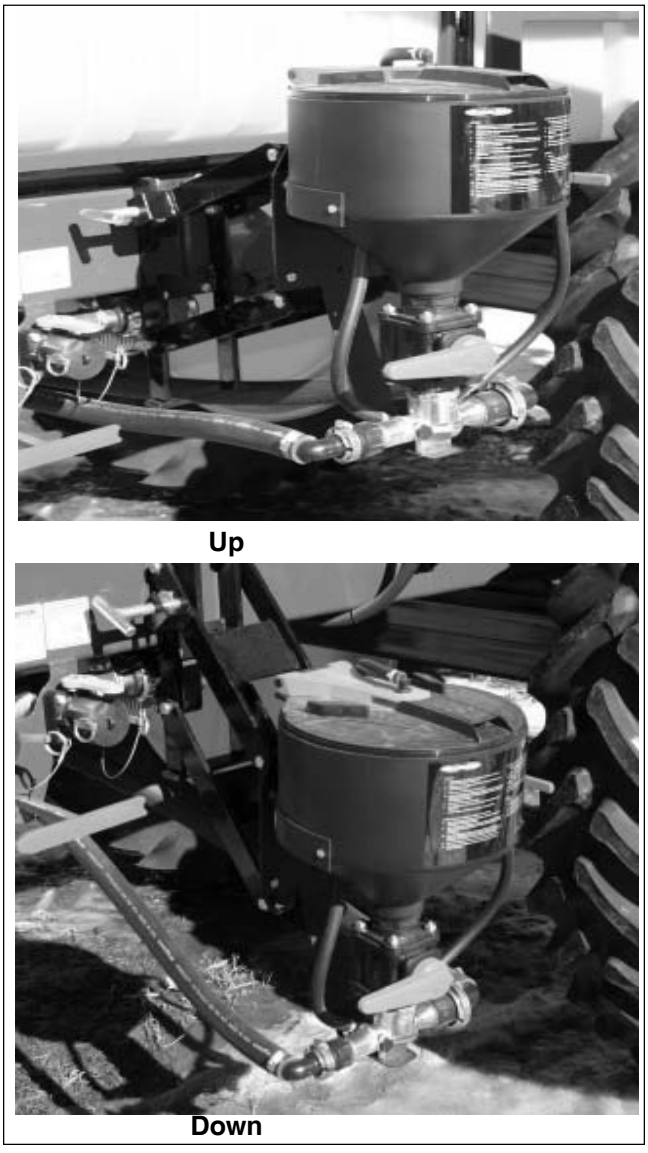


Fig. 43 EDUCTOR TANK

35. **Ground Speed Sensor (Optional):**

A. Sprayers that are equipped with an automatic controller must have a way to measure ground speed. A magnetic sensor is mounted on the right hand wheel. Be sure the magnet clearance is set and maintained at 1/8 inch (3 mm) or the thickness of a nickel.

a. Magnetic Speed Sensor.

b. Metal Posts.

c. Wiring Harness to Tractor Radar.

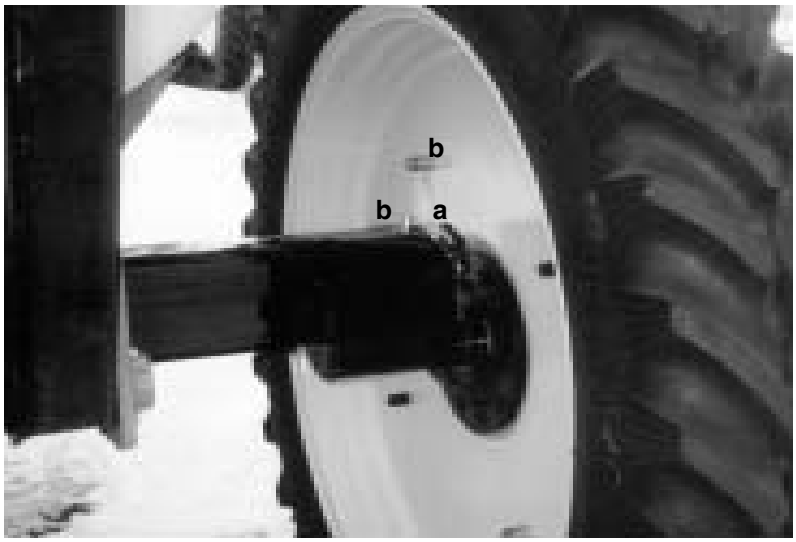


Fig. 44 GROUND SPEED SENSOR

B. The ground speed proximity magnetic sensor system is located on the right wheel. It consists of the magnetic sensor and the associated wiring. To generate the required signal, the magnet must be set and maintained at the proper distance from the pegs.

Set the magnet at 1/8 inch (3 mm) or the thickness of a nickel from the pegs. Use the adjusting nuts and threads on sensor to set the gap. Be sure to tighten fasteners carefully as to not strip threads on plastic sensor.

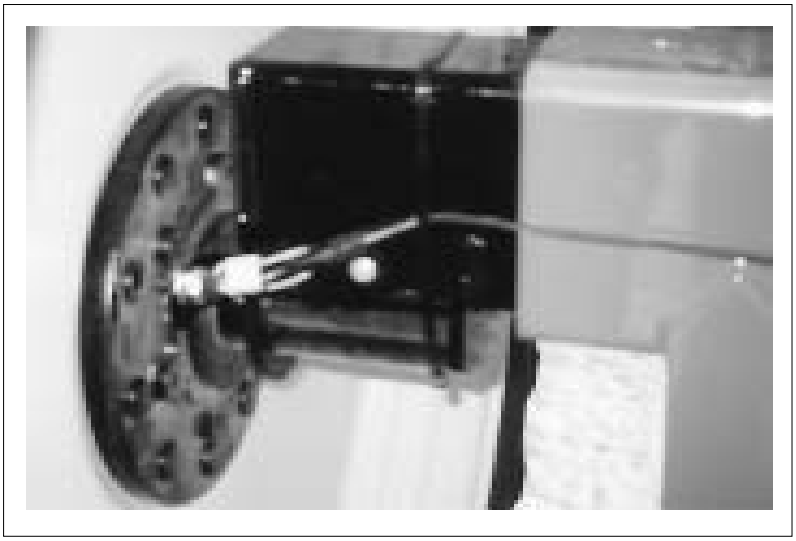


Fig. 45 SENSOR MOUNTING

C. Ground Speed Sensor (Optional):
Raven Radar (TYP installation shown). Refer to set-up instruction enclosed with Radar and Raven Controller for set-up and calibration information.

Fig. 46 GROUND SPEED SENSOR RAVEN RADAR

D. Ground Speed Sensor (Optional):
Sky Trak Speed Sensor, install per manufacturer's instruction and calibrate per instruction in Raven Auto Rate Controller manual.

Fig. 47 SKY TRAK SPEED SENSOR

36. **Foam Mark System (Optional):**
A sprayer can be equipped with a foam marking system. It consists of a tank on the right side of the frame, lines, a mixing chamber on the boom and an dispenser funnel on each boom. Be sure the dispenser hangs down when the boom is extended. Switch the system on as required to dispense foam across the field.

Direct Injection (Foam Concentrate Tank Shown)

Mixing Chamber Mounted on Wings

Fig. 48 FOAM MARKER SYSTEM

37. **Wheels:**
The sprayer can be equipped with single or dual wheels to allow the use of narrow tires or reduce compaction. Be sure to center the tires between the rows to minimize crop damage.

Single

Duals

Fig. 49 WHEELS

38. **Rinse Tank Access:**
The 100 gallon rinse tank is mounted on the front of the frame to provide clean rinse water when required. Although the tank is filled from the left side of the frame, the tank can be accessed from the top.

Fig. 50 RINSE TANK

39. **Ladder:**
The front frame is designed with a platform and an access ladder. The ladder can be raised or lowered as required for filling the tank or operating in the field. Raise the ladder into the vertical position and push over center to secure in the locked position. The hydraulic dampener holds the ladder in the up (stowed) position. Position the ladder in the up position whenever the sprayer will be moved.

Up

Down

Fig. 51 PLATFORM LADDER

41. **Chemical Circuit Control System:**
Sprayers are equipped with chemical circuit control components that are mounted on the trailer, center section, and wings as required by model. When equipped with the automatic circuit controller, the valves, flow meter and solenoids are all mounted on the trailer, center section, and wings.

Fig. 53 CONTROL SYSTEM

42. Mix only the quantity of spray required for the job. Excess chemicals are difficult to store and dispose of. Do not dispose of them in the farmyard or your drainage system. They will contaminate these areas.

WARNING

Do not dispose of it in the farmyard or in drainage ditches.

43. Store chemicals only in their original containers under lock and key to prevent children or animals from touching them.

44. Be very careful to wear the proper protective gear such as rubber gloves and goggles to protect yourself. Thoroughly wash all protective gear with a good detergent after use to remove all chemicals.

45. Never allow chemicals or solutions to touch the skin. Some can be absorbed through the skin. Should such a contact occur, flush the affected area immediately with clear water. Wash the area thoroughly with detergent to remove any residue.

46. When spraying is done, the machine should always be rinsed. Follow this procedure:

    a. Add 25 to 50 gallons of water to the tank.

    b. Run the pump, wash circuit and agitator for 5 minutes to circulate and rinse the inside of the tank.

    c. Spray the rinse thinly over the previously sprayed field.

47. When spraying is finished for the season or when switching chemicals, wash the sprayer using the method described in the Maintenance Section.

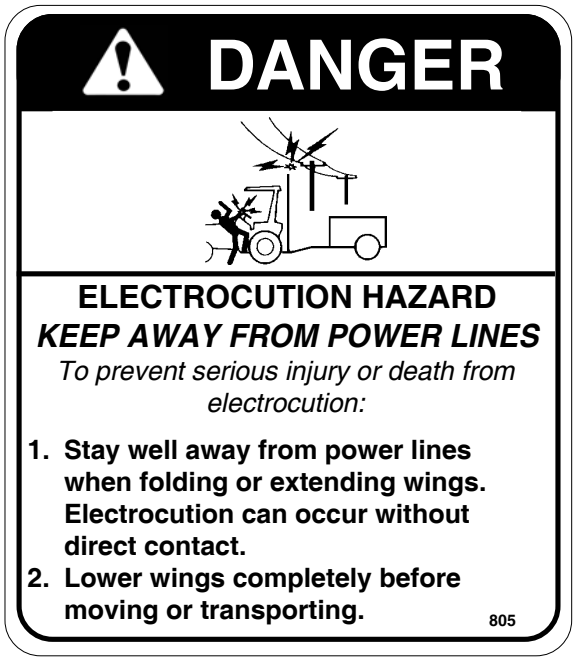
4.11 TRANSPORT/FIELD CONVERSION

The sprayer is designed to easily convert from transport to field or field to transport.

When converting from transport to field, follow this procedure:

1. Clear the area of bystanders, especially children, before starting.

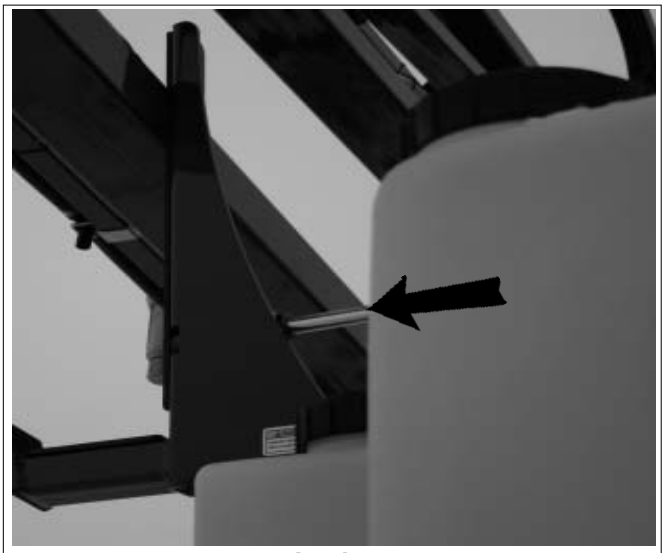
2. Convert only in an area that is free of overhead obstructions and power lines. Electrocution can occur without direct contact.



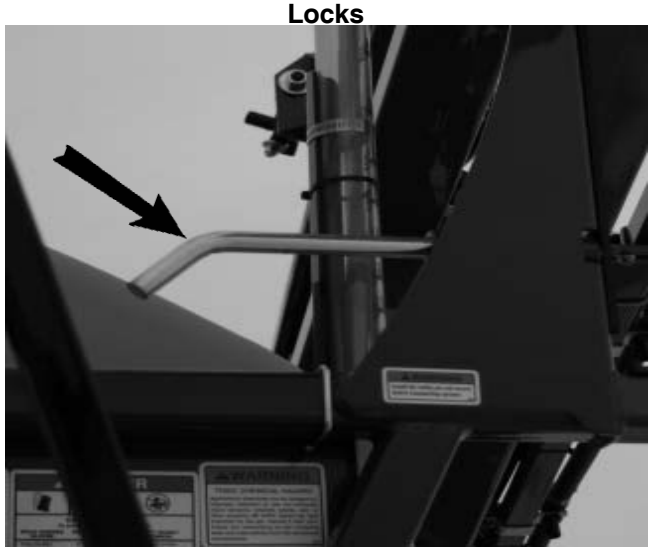
3. Place all controls in neutral, stop engine, set park brake and remove ignition key before dismounting.

4. Retract transport lock pins from the cradles.

5. Open the valve to the boom lift cylinder that allows the boom to lower. (9500/9600 60'-100' Spray width trailers shown,120-132' spray width trailers shut off located on hydraulic block)



Locks



Pin (Typical)

Fig. 54 TRANSPORT LOCK PINS

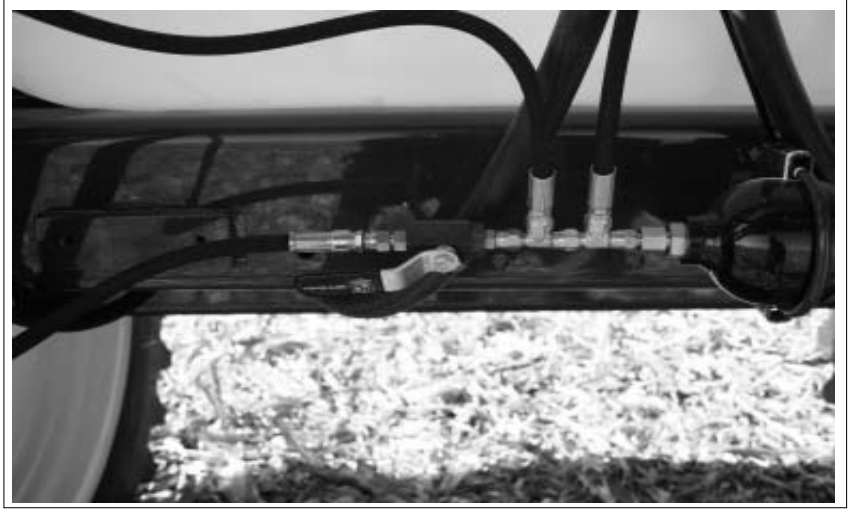


Fig. 55 BOOM CYLINDER VALVE

6. Be sure there is sufficient space to swing the booms into their field position.

7. Start the tractor and run at 1/3 throttle to provide oil for boom position cylinders (Refer to Section 4.6 for Controller Switch Functions).

8. Raise booms up to lift them out of their cradles.

9. Extend inner booms out until they are 90° to the frame. Watch for any interference.

10. Pivot outer booms out into their fully extended position.

11. Lower boom to its lowest position.

12. Be sure foam marker cup is hanging down.

13. Reverse the above procedure when converting from field to transport configuration.

Clearing Cradle

Inner Boom Extending

Outer Boom Extension

Fig. 56 EXTENDING BOOMS

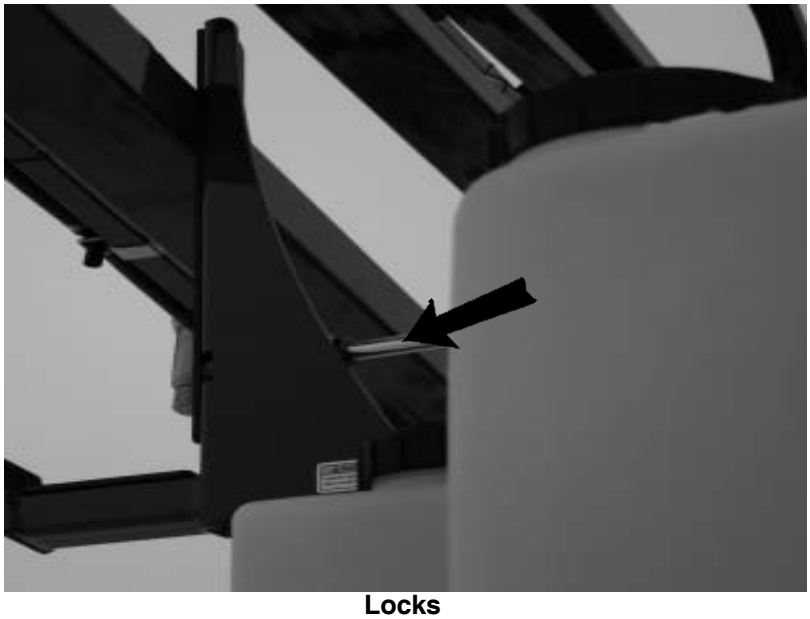
4.12 TRANSPORT

TRANSPORT SAFETY

1. Read and understand ALL the information in the Operator's Manual regarding procedures and SAFETY when operating the Sprayer in the field and/or on the road.
2. Check with local authorities regarding sprayer transport on public roads. Obey all applicable laws and regulations.
3. Always travel at a safe speed. Use caution when making corners or meeting traffic.
4. Make sure the SMV (Slow Moving Vehicle) emblem and all the lights and reflectors that are required by the local highway and transport authorities are in place, are clean and can be seen clearly by all overtaking and oncoming traffic.

FAST AG Solutions sprayers are designed to be easily and conven-iently moved from field to field. When transporting, follow this procedure:

1. Be sure all bystanders are clear of the machine.
2. Be sure that the Sprayer is hitched positively to the towing vehicle. Always attach the safety chain between the machine and the tractor and use a retainer on the drawbar pin.
3. Keep to the right and yield the right-of-way to allow faster traffic to pass. Drive on the road shoulder, if permitted by law.
4. Make sure the SMV (Slow Moving Vehicle) emblem and all the lights and reflectors that are required by the local highway and transport authorities are in place, are clean and can be seen clearly by all overtaking and oncoming traffic.
5. **Install Transport Locks:**
    a. Extend and secure cradle locks over each boom. Secure with retainer.



Locks

Pin

Fig. 57 BOOM LOCKS

b. Close boom lift cylinder line valve.

6. It is not recommended that the machine be transported faster than 20 mph (32 km/hr). Table 6 gives the acceptable transport speed as the ratio of tractor weight to sprayer weight.

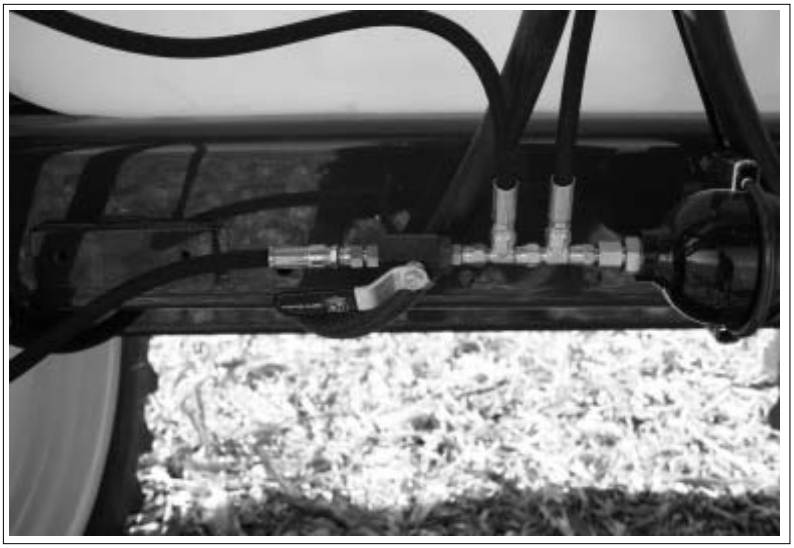


Fig. 58 VALVE

Table 6 Travel Speed vs Weight Ratio

Road Speed	Weight of fully equipped or loaded implement(s) relative to weight of towing machine
Up to 32 km/h (20 mph)	1 to 1, or less
Up to 16 km/h (10 mph)	2 to 1, or less
Do not tow	More than 2 to 1

7. Do not allow riders on the machine or tractor.

8. During periods of limited visibility, use pilot vehicles with the sprayer.

9. Always use hazard flashers on the tractor when transporting unless prohibited by law.

Fig. 59 TRANSPORTING

4.13 STORAGE

4.13.1 PLACING IN STORAGE

At the end of the spray season, the machine should be thoroughly inspected and prepared for storage. Repair or replace any worn or damaged components to prevent any unnecessary down time at the beginning of the next season. Follow this procedure:

1. Thoroughly wash the machine using a hose or a pressure washer to remove all dirt, mud, debris or residue.

2. Thoroughly wash the inside of the tank and spray system with the wash cycle to remove all chemical residue using the method described in the Maintenance Section.

3. In climates that encounter freezing temperatures during the storage period, the following preparation should be done:

   a. Add 10 gallons (40 liters) of a 50:50 mixture of potable RV antifreeze to the rinse tank.

   b. Run unit for 5 minutes in the wash and spray cycles to circulate solution to all parts of the circuit.

   c. While circulating the fluid, open and close all the valves in the chemical and eductor tank circuits several times to flush all the water from the system.

   d. Draw the solution out of the chemical tank.

   e. Flush the solution out the booms.

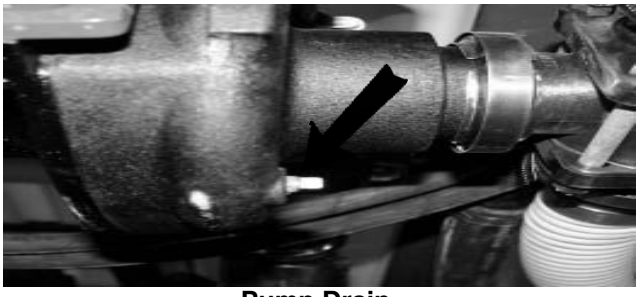
   f. Open all disconnects and drain hoses, pumps, filters, solenoids and tanks.

   g. Remove nozzles from boom. Disassemble and wash nozzle, spring, diaphram and housing. Store inside.

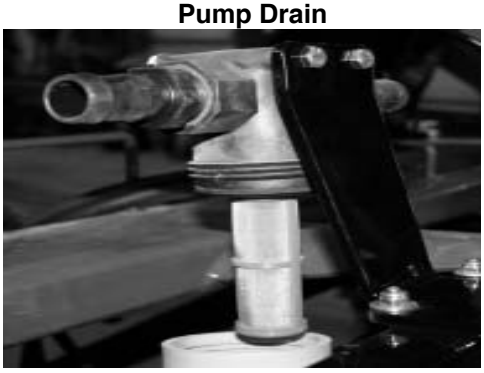
STORAGE SAFETY

1. Store unit in an area away from human activity.
2. Do not permit children to play on or around the stored sprayer.
3. Unhook and store in the **transport** configuration.

Flush Tank



Pump Drain



Filters (Typical)

Nozzles

Fig. 60 STORAGE

4. Lubricate all grease points. Make sure all grease cavities have been filled with grease to remove any water residue from the washing.

5. Inspect all the hydraulic hoses, couplers and fittings. Tighten any loose fittings. Replace any hose that is badly cut, nicked, abraded or is separating from the crimped end of a fitting.

6. Inspect all the spray hoses and fittings. Tighten any loose fittings. Replace any hose that is badly cut, nicked, abraded or is separating from a fitting.

7. Touch up all paint nicks and scratches to prevent rusting.

8. Move the machine to it's storage position.

9. Select an area that is dry, level and free of debris.

10. Place planks under the jack for added support if required.

11. Unhook the machine from the tractor (Refer to Section 4.8).

12. Remove the control boxes from the cab and store inside.

13. The tank is made out of polyethylene. Do not use to store petroleum products. They will soften the plastic and absorb the product.

14. It is best to store the sprayer in a shaded area to minimize the long term effect of ultraviolet radiation on the plastic. If shade is not available, cover the tank with a tarpaulin and secure in place.

4.13.2 REMOVING FROM STORAGE

When removing from storage and preparing to use, follow this procedure:

1. Clear the area of bystanders, especially small children, and remove foreign objects from the machine and the working area.

2. Remove the tarpaulin if it was used for storage.

3. Attach the tractor to the sprayer by following the procedure in Section 4.8.

4. Check

   a. Tank for cracks.

   b. Tank hold down hardware.

   c. All hardware. Tighten as required.

   d. Tire pressure.

   e. All sprayer and hydraulic lines, fittings and connections. Tighten as required.

5. Lubricate all grease fittings.

6. Replace any defective parts.

7. Fill the tank with 20 gallons (75 liters) of clean water and run for 5 minutes in the wash cycle. Open and close all valves several times. Flush water through the booms.

   Install the nozzles. Run water through booms, and check for leaks.

8. Repeat step 6.

9. Calibrate the pump, nozzles and sprayer before using.

10. Go through the pre-operation checklist (Section 4.4) before using.

5 SERVICE AND MAINTENANCE

MAINTENANCE SAFETY

1. Review the Operator's Manual and all safety items before working with, maintaining or operating the Sprayer.

2. Place all controls in neutral, stop the tractor engine, turn monitor off, set park brake, remove ignition key, wait for nozzles to stop spraying before servicing, adjusting, repairing or unplugging.

3. Follow good shop practices:
   - Keep service area clean and dry.
   - Be sure electrical outlets and tools are properly grounded.
   - Use adequate light for the job at hand.

4. Before applying pressure to a hydraulic system, make sure all components are tight and that steel lines, hoses and couplings are in good condition.

5. Before applying pressure to chemical system make sure that all connections are tight and that all hoses and fittings are in good condition.

6. Relieve pressure from hydraulic circuit before servicing or disconnecting from tractor.

7. Keep hands, feet, clothing and hair away from all moving and/or rotating parts.

8. Clear the area of bystanders, especially children, when carrying out any maintenance and repairs or making any adjustments or filling.

9. Place stands or blocks under the frame before working beneath the machine.

10. Wear safety goggles, neoprene gloves and protective clothing when working on the sprayer filled with active chemical.

11. Wash machine to remove all chemical residue before working on unit. Wear appropriate protective gear at all times.

12. Protect yourself from chemical contamination.

5.1 SERVICE

5.1.1 FLUIDS AND LUBRICANTS

1. Grease
   Use an SAE multi-purpose high temperature grease with extreme pressure (EP) performance. Also acceptable is an SAE multi-purpose lithium base grease.

2. Storing Lubricants
   Your machine can operate at top efficiency only if clean lubricants are used. Use clean containers to handle all lubricants. Store them in an area protected from dust, dirt, moisture and other contaminants.

5.1.2 GREASING

Refer to Section 5.1.1 for recommended grease. Use the Maintenance Checklist provide to keep a record of all scheduled maintenance.

1. Use only a hand-held grease gun for all greasing.

2. Wipe grease fitting with a clean cloth before greasing, to avoid injecting dirt and grit.

3. Replace and repair broken fittings immediately.

4. If a fitting will not take grease, remove and clean thoroughly. Also clean lubricant passageway. Replace fitting if necessary.

5.1.3 SERVICING INTERVALS

8 Hours or Daily

1. Grease telescoping hitch rollers. (2 location each trailer).

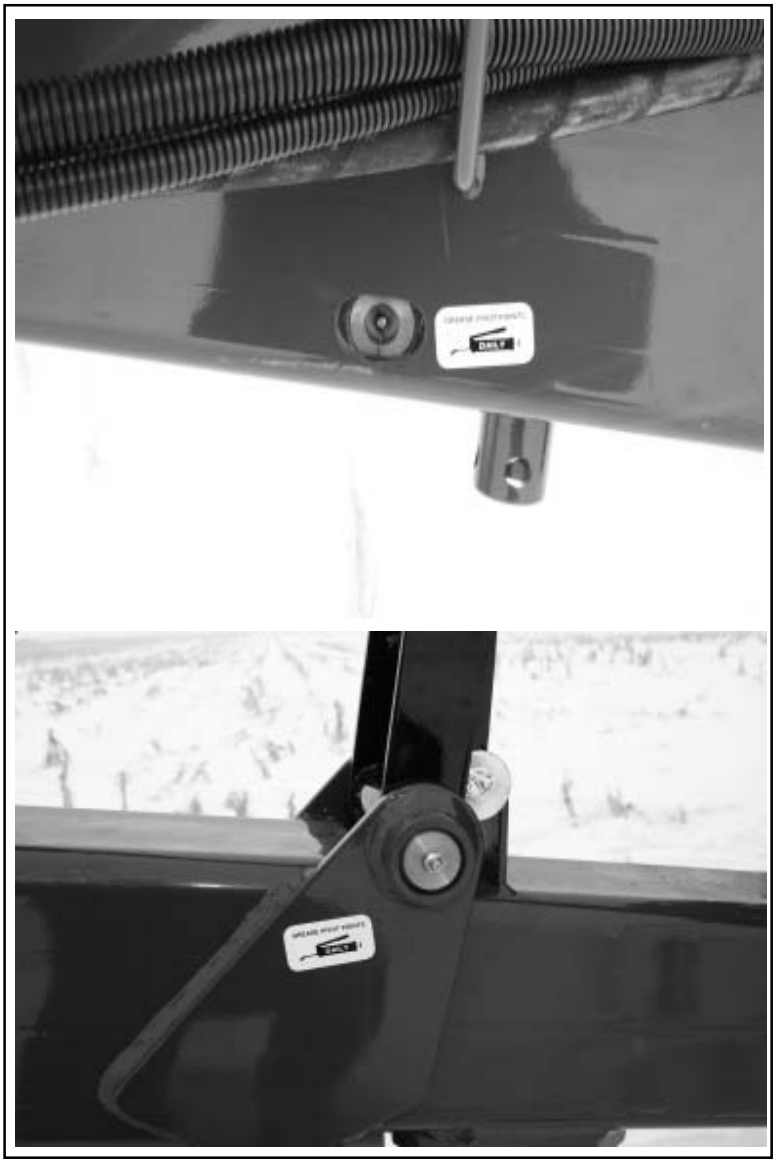


Fig. 61 TELESCOPING HITCH
9600 Series 80-100' Wings
9500 Series 120-132' Wings

2. Grease boom fold hinge. (2 locations each boom).

9500/9600 Upper Pivot RH & LH
60' thru 100' Wings

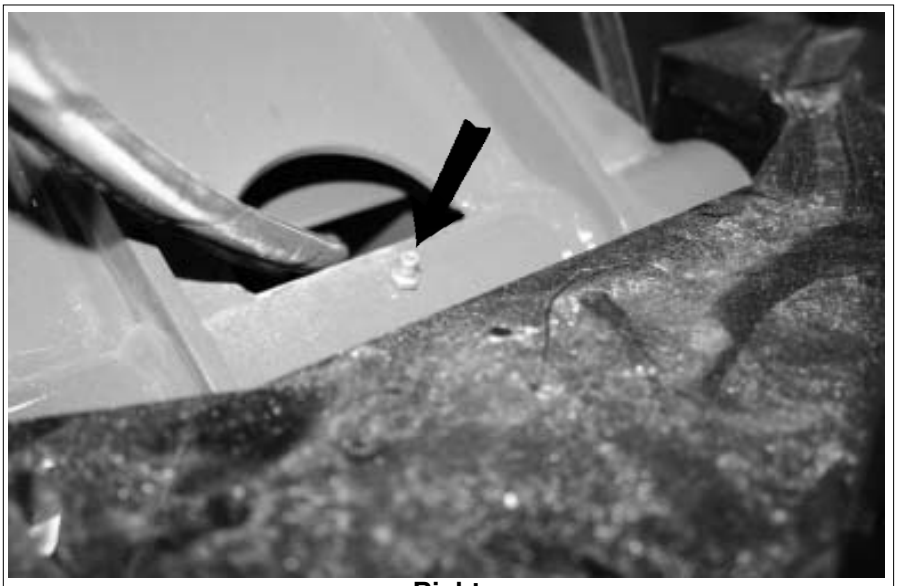
Wing Pivot for 9500 Series 120-132' wings (RH Shown)

9500/9600 Lower Pivot RH & LH
60' thru 100' Wings

Grease Zerk in Wing Pivot 120-132' units

Fig. 61a BOOM FOLD PIVOT

3. Grease boom tilt pivot. (1 location each boom).



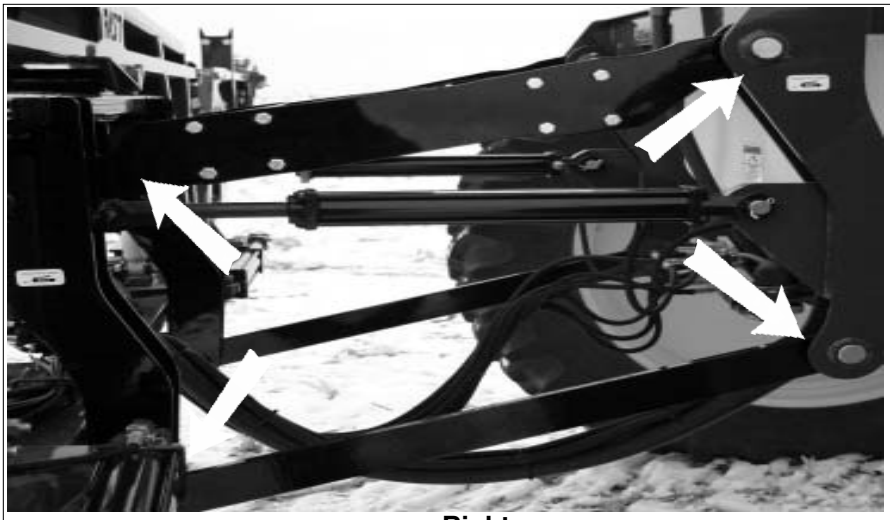
Right

Left

Fig. 62 BOOM TILT PIVOT

4. Grease the boom lift parallel linkage (4 locations each side).

Fig. 63 PARALLEL LINKAGE



Right

Left

5. Grease outer boom hinge. (1 location each boom).

9500 Series 120-132' Flip Wings (2 per pin/side)

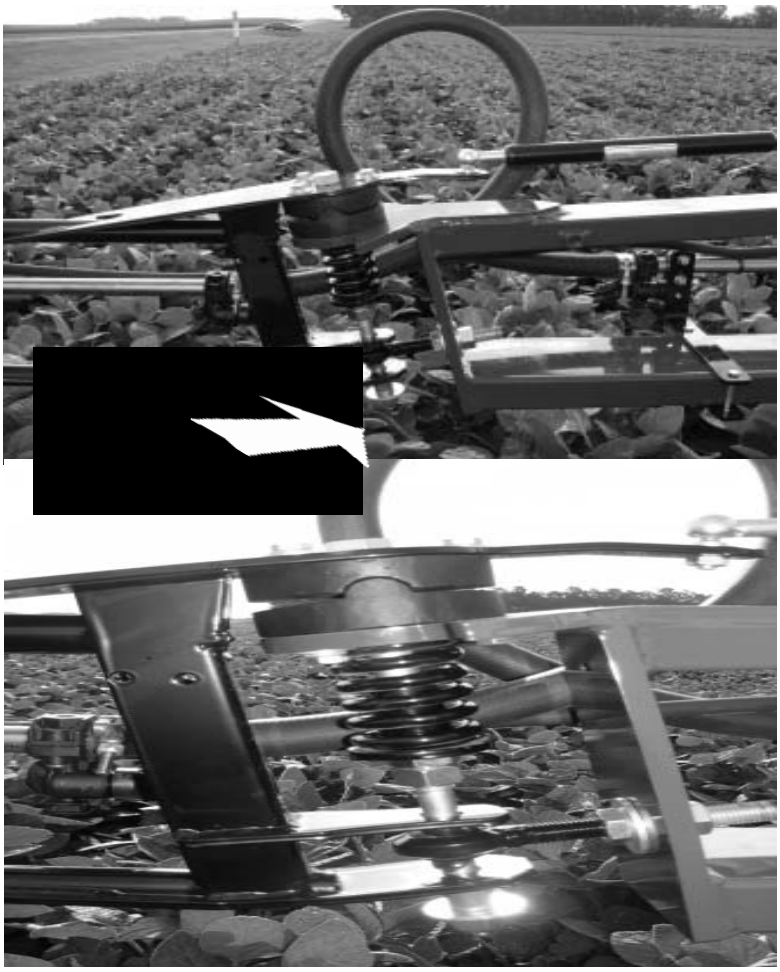
9500,9600 Series 60 thru 100' Wings (1 per pin/side)

9500 Series 120-132' Flip Wing Linkage (1 zerk per side)

9500 Series 120-132' Swing Wing Pin (2 zerk per pin/side)

Fig. 64 OUTER BOOM

6. Grease outer boom break - away hinge bolt (1 zerk on bottom of bolt).
   Top 2 photo's are of 60-100' wet boom breakaway



IMPORTANT

Bottom photo at right are for 120-132' units. Make sure shipping lock bolt is removed from latch before use.

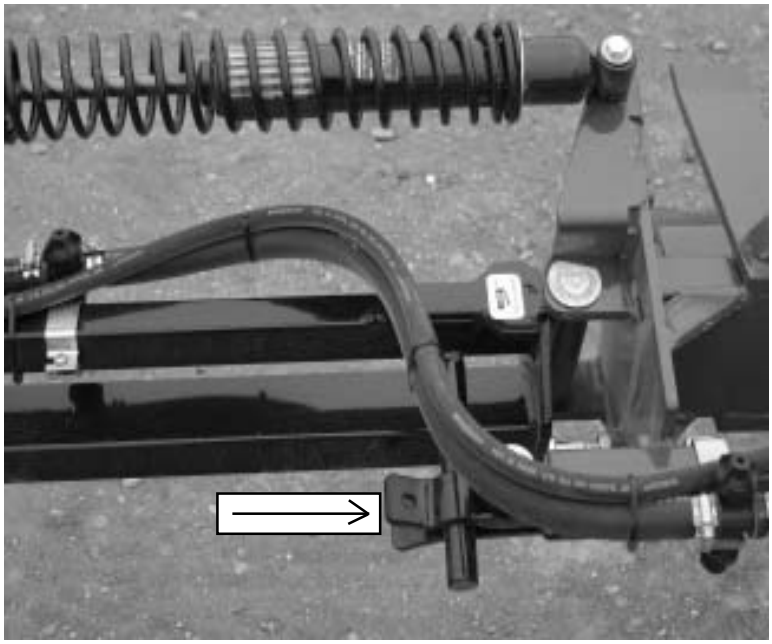
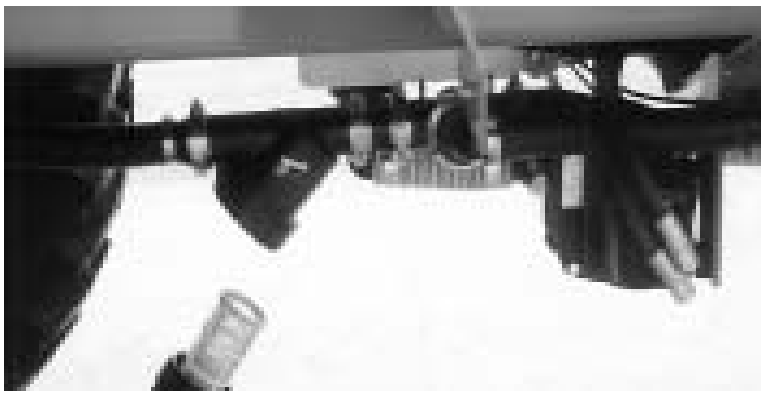


Fig. 65 BREAK - AWAY HINGE

7. Clean chemical circuit screens in the chemical circuit filters.

   a. Boom control feed line (30 mesh).



Boom Control Feed Line

   b. Boom feed lines (1 per boom valve - 50 mesh).

Boom Strainers (Typical)

Fig. 66 SCREENS

Annually

1. Wash machine.

2. Grease and repack wheel bearings.

Fig. 67 WHEELS

5.1.4 SERVICE RECORD

See Lubrication and Maintenance sections for details of service. Copy this page to continue record.

ACTION CODE: CL CLEAN L LUBRICATE R REPACK

MAINTENANCE / HOURS / SERVICED BY																		
8 Hours or Daily																		
L Boom Fold Hinge (2 ea.)																		
L Boom Tilt Pivot (1 ea.)																		
L Boom Lift Parallel Linkage (4 ea.)																		
L Outer Boom Hinge (1 ea.)																		
L Swing Wing Hinge (1 ea.)																		
L Outer Boom Break-Away Hg (1 ea.)																		
CL Chemical Circuit Screens (3)																		
Annually																		
CL Machine																		
L/R Wheel Bearings																		

5.2 MAINTENANCE

By following a careful service and maintenance program for your machine, you will enjoy many years of trouble-free operation.

5.2.1 FILTER CLEANING

The fluid in the sprayer is continually being filtered through a screen filter in the boom control feed line, agitation and boom feed lines. The sprayer must have clean water to prevent clogging of the screens and check valves when in use. These screens must be cleaned daily or more often as required. To clean, follow this procedure:

1. At the start of each day before the water and chemicals are added, the screens should be checked and cleaned.

2. If there is water or solution in the sprayer, close Valve 2 to isolate the screens.

3. Loosen the filter bodies by hand. Do not use a wrench as this could damage the filter body.

4. Remove the screens and inspect them for dirt.

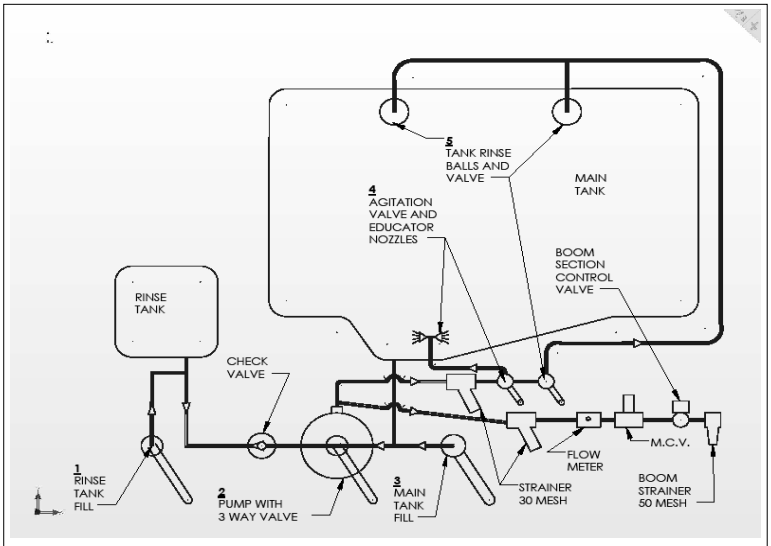
5. Clean them using clean water.

6. Inspect for holes or tears. If there is damage, replace it.

7. Install the screens and body to the filter heads and tighten by hand. Do not use a wrench as this might damage the body. Do not over tighten and crack the head.

8. Open the ball valves to allow the solution to circulate.

9. Drain all screens before storage to avoid freezing.



Schematic

Boom Line (Typical)

Boom Feed

Fig. 68 SCREENS

5.2.2 TANK CLEANING

A. Daily Cleaning

At the end of the working day, clean the system using this procedure:

1. After the chemical solution has been completely sprayed out through the booms, add 20 gallons (75 liters) of clear water to the tank.
2. Run at rated speed to force the solution through the agitator jets and wash head(s). Run for 5 minutes.
3. Spray the rinse lightly over previously sprayed crop.
4. Add another 30 gallons (200 liters) of clean water and run rinse/wash cycle for 5 minutes.
5. Flush the rinse solution out of the booms to clean the hoses and plumbing over the appropriate crop.
6. Rinse the system again with clean water.
7. Clean the screen and nozzles.
8. Drain tank and let dry.

B. Changing Chemicals and/or Annual Wash to Remove Salt and Amine Formations

1. Do the rinse procedure outlined for Daily Cleaning.
2. Add 50 gallons (200 liters) of clean water to the tank.
3. Remove nozzles and screen and wash separately.
4. Add 1/2 gallon (2 liters) of household ammonia to the tank (1 part ammonia to 100 parts water).
5. Run rinse/wash cycle for 5 minutes.
6. Spray half the solution out the boomsover the appropriate crop .
7. Let the balance sit for a minimum of 8 hours, overnight is best.
8. Run wash cycle for 10 minutes and spray solution out the booms on the appropriate crop.
9. Rinse the system thoroughly with clean water and flush out the booms over the appropriate crop .
10. Drain the entire system and let dry.

C. Changing Chemicals and/or Annual Wash to Remove Esters of 2, 4-D and MCPA Formations

1. Do the wash and rinse procedures outlined for Daily Cleaning.
2. Add 50 gallons (200 liters) of clean water to the tank.
3. Remove nozzles and screen and wash separately.
4. Add dishwasher detergent to the tank (2lbs./ 50 gal or 1 kg/300 l of water).
5. Run rinse/wash cycle.

WARNING

Do not enter tank at any time.

6. Spray the solution out the booms on the appropriate crop and drain thoroughly.
7. Add 50 gal (200 l) of clean water to the tank.
8. Add 1/2 gal (2 l) of household ammonia to the tank (1 part ammonia to 100 parts of water).
9. Run wash cycle.
10. Spray 1/2 the solution out the booms.
11. Let the balance sit for a minimum of 8 hours, overnight is best.
12. Run rinse/wash cycle for 10 minutes and spray out the booms on the appropriate crop.
13. Rinse the system thoroughly with clean water and flush out the booms.
14. Drain the entire system and let dry.

5.2.3 BOOM BREAK-AWAYS

For 120-132' wings

IMPORTANT

Make sure shipping lock bolt is removed from latch before use.

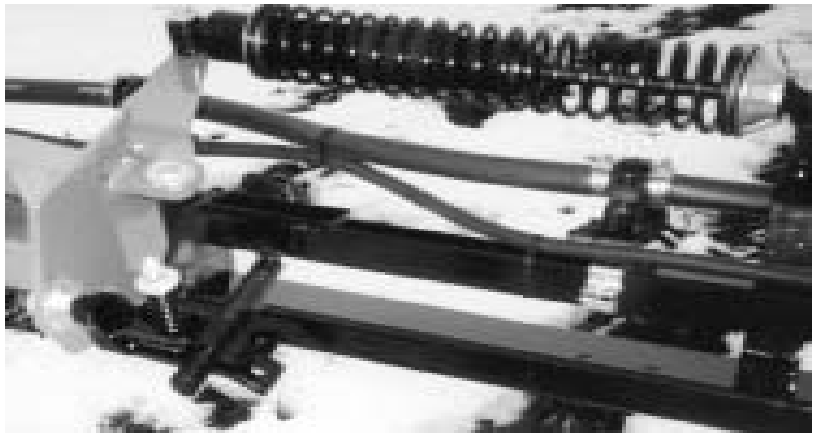
Each boom is designed with a break-away hinge that allows it to swing backward as required when encountering an obstruction to prevent mechanical damage from the obstruction. To adjust the break-away tension, follow this procedure:

1. Clear the area of bystanders, especially small children, before starting.

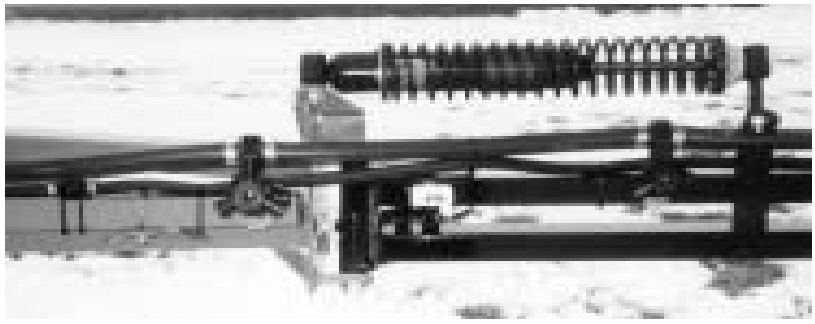
2. Place all controls in neutral, stop engine, set park brake, remove ignition key and wait for all moving parts to stop before dismounting.

3. Use the bolt to compress or relax the spring clamping force of the break-away hinge as required.

4. The proper tension will require one person pulling hard on the end of the boom to break it away.



Left for 120-132' units



Right for 120-132' units

WET BOOM BREAKAWAYS

For 60-100' units

Fig. 69 BOOM BREAK-AWAY HINGE

5.2.4 WHEEL TREAD

The sprayer is designed with an adjustable axle that allows setting at 62, 80,88 and 120 inch wheel tread. Set appropriately for your application. When changing the wheel tread, follow this procedure:

1. Clear the area of bystanders, especially small children, before starting.

2. Place all controls in neutral, stop engine, set park brake, remove ignition key and wait for all moving parts to stop before dismounting.

3. Place a jack with appropriate capacity under the axle and raise until the tire clears the ground.

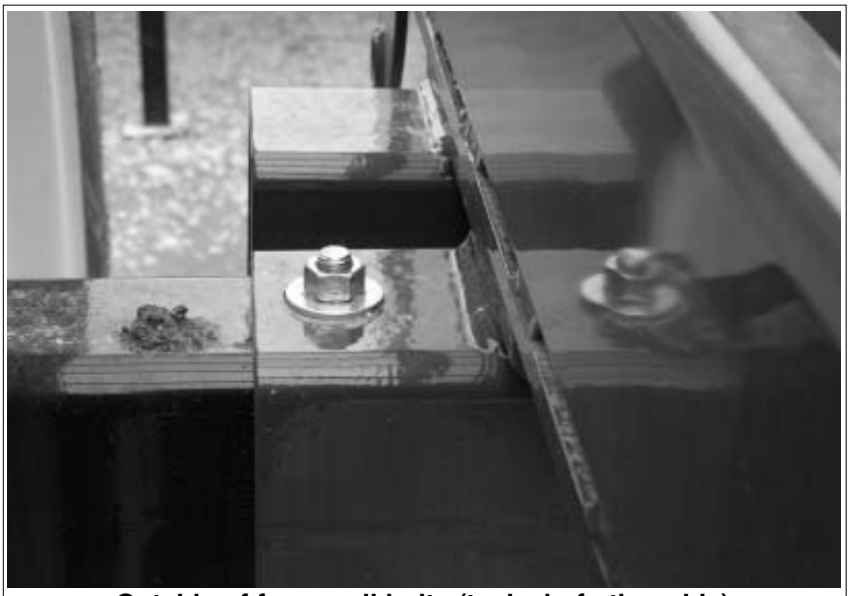
4. Loosen the 2 anchor bolts through the axle.

5. Slide the wheel/axle assembly to its new position.

6. Tighten anchor bolts to their specified torque.

7. Lower and remove jack.

8. Repeat on the other axle.



Outside of frame rail bolts (typical of other side)

9500 / 9600 Series

Fig. 70 AXLE ANCHOR BOLTS

5.2.5 BOOM STRAIGHTNESS

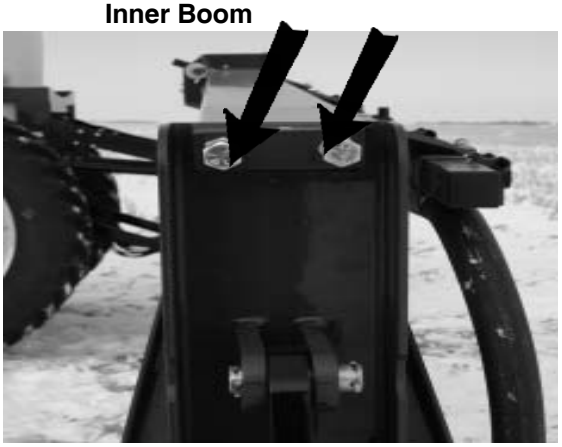
The boom on each machine are designed with set screw adjustments that provide a method to adjust for straightness. By keeping the booms straight, the sprayer produces a consistent clearance to the crop.

When adjusting boom straightness, follow this procedure:

1. Clear the area of bystanders, especially small children, before starting.
2. Place machine in field configuration with the boom about waist high.
3. Place all controls in neutral, stop engine, set park brake, remove ignition key and wait for all moving parts to stop before dismounting.
4. Sight along the boom to be sure it is straight at each hinge.
5. Loosen the position bolt jam nut at a hinge.
6. Turn position bolt to the required position and tighten jam nut to its specified torque.
7. Repeat with other hinges as required.

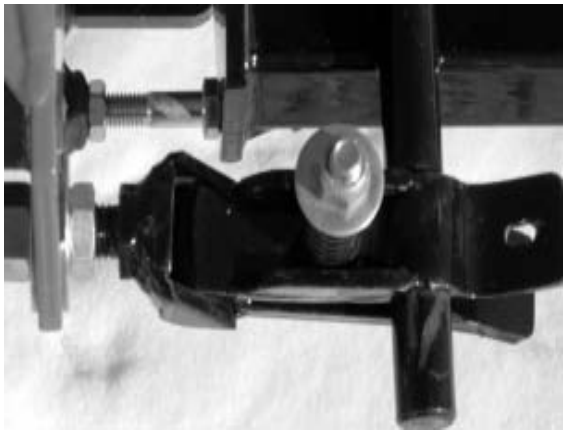
Sighting

Inner Boom



Outer Boom

Swing Wing 120-132' only



Break-away Latch 120-132' units

Fig. 71 BOOM STRAIGHTNESS

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6 TROUBLE SHOOTING

The FAST AG Solutions Field Sprayer uses a pressure circuit to deliver a chemical compound in solution to a series of nozzles for application to crops. It is a simple and reliable system that requires minimal mainte-nance.

In the following section, we have listed many of the problems, causes and solutions to the problems that you may encounter.

If you encounter a problem that is difficult to solve, even after having read through this trouble shooting section, please call your local FAST AG Solutions dealer or distributor. Before you call, please have this Operator's Manual and the serial number from your machine ready.

PROBLEM	CAUSE	SOLUTION
Sprayer is not stable. Moves from side-to-side.	Low tire pressure.	Add air to tires.
	Loose wheel bolts.	Tighten wheel bolts.
System loses pressure.	Filter screen plugged.	Clean chemical line screens.
	Pump worn.	Check and repair or replace pump.
	Faulty suction hose.	Check for collapsed suction hose. Replace hose.
	Faulty regulator.	Replace regulator.
	Hose leaking.	Tighten hose or replace hose.
Sprayer pressure too high.	Return hose plugged.	Clean or replace hose.
	Faulty pressure sensor.	Calibrate sensor. Replace as required.
	Faulty regulator.	Repair or replace valve.
	Wrong agitation valve setting.	Open agitation valve slightly until pressure goes to required range.
	Tip too small for volume	Check tip chart for proper size

PROBLEM	CAUSE	SOLUTION
Chemical system pressure too low.	Return hose plugged.	Clean or replace hose.
	Faulty pressure sensor.	Calibrate sensor. Replace as required.
	Faulty regulator.	Repair or replace valve.
	Wrong agitation valve setting.	Close agitation valve slightly until pressure goes to required range.
Check valves or screens plugging.	Dirty water.	Flush and clean the system. Use clean water.
	Poorly mixed chemicals.	Mix chemicals slower. Follow mixing instructions.
High spray drift.	Boom set too high.	Lower boom
	Too windy.	Wait until wind dies down.
The pump does not draw water.	Pump is airlocked.	Bleed air from pump.
	Suction line is plugged or collapsed.	Examine suction line. Replace as required.
	Pump faulty.	Replace pump.
Pressure reading fluctuates.	The pump is sucking in air through the intake or air has not been entirely evacuated from the pump.	Examine the suction hose and make sure it is firmly secured. Run the pump with the outlet hose open to evacuate air from pump.
	Regulator broken.	Replace regulator.
The spray flow is irregular.	Filter screen plugged.	Clean screens.
	Nozzle screens plugged.	Clean nozzle screens.

PROBLEM	CAUSE	SOLUTION
Can't develop enough pressure.	Broken pressure regulator.	Replace pressure regulator.
	Worn pump.	Repair or replace pump.
	Leaking hose or fitting.	Replace hose or tighten fitting.
	Pump running too slow.	Increase oil flow to pump to increase pump speed.
	Wrong agitation valve setting.	Close agitation valve slightly until pressure goes to required range.
	Tip size to large	Check tip capacity for proper size
No pressure reading.	Poor connection.	Clean connection. Push firmly together.
	Defective sensor.	Replace sensor.
	Defective controller gauge.	Replace gauge.
Spray won't shut off.	Defective switch in monitor.	Replace switch.
	Solenoid valve doesn't close.	Magnet stuck. Spring broken. Replace defective parts.
Controller doesn't control sprayer.	Blown fuse.	Replace fuse.
	Poor connection.	Pull connections apart. Clean terminals. Reconnect.
	No power.	Connect power wire.
	Refer to Controller Manual.	Refer to Controller Manual.
Booms bouncing.	Traveling too fast.	Slow down.

7 SPECIFICATIONS

7.1 MECHANICAL 9500 SERIES

DIMENSIONS/INCHES	60 FOOT	80 FOOT	88 FOOT
Length: Field	233	233	233
Width: Field:	720	960	1056
Transport:	144	144	144
Height: Transport:	127	133	133
Weight: Empty:	7380	7580	7720
Tank Capacity (Gallons):	1800,2400	1800,2400	1800,2400
Working Spray Range:	17-72	17-72	17-72
Wheel Tread:	STD 80,88, 120	STD 80,88, 120	STD 80,88, 120
	OTHER SPACINGS AVAILABLE	OTHER SPACINGS AVAILABLE	OTHER SPACINGS AVAILABLE
PUMP	9306C HM1	9306C-HM1	9306C-HM1
Hydraulically driven: (Input)	11 GPM	11 GPM	11 GPM
Performance: (Output)	214 GPM	214 GPM	214 GPM
Call for other pump options			
Tank Agitators:	JET AGITATION	JET AGITATION	JET AGITATION
Wash Head:	2	2	2
TIRES			
Trailer:	1800 GALLON	1800 GAL.LON	1800 GAL.LON
Tire size	380/90R46	380/90R46	380/90R46
Pressure	SEE TIRE CHART	SEE TIRE CHART	SEE TIRE CHART
	2400 GALLON	2400 GAL.LON	2400 GAL.LON
Tire Size	480/80R42	480/80R42	480/80R42
Tire Pressure	SEE TIRE CHART	SEE TIRE CHART	SEE TIRE CHART
Hubs:	10-BOLT	10 BOLT	10 BOLT
Lug Nut Torque:	265#	265#	265#
OPTIONAL: CONTROLLERS			
450 Raven			
Power: 12v	12 VOLT 15 AMP	12 VOLT 15 AMP	12 VOLT 15 AMP
Cab Fold Box:	12 VOLT 10 AMP	12 VOLT 10 AMP	12 VOLT 10 AMP

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

90 FOOT	100 FOOT	120 FOOT	132 FOOT
233	260	304	304
1080	1200	1440	1584
144	144	144	144
133	133	150	150
7750	8000	11,160	11,400
1800,2400	1800,2400	1800,2400	1800,2400
17-72	17-72	17-72	17-72
STD 80,88, 120	STD 80,88, 120	STD 80,88, 120	STD 80,88, 120
OTHER SPACINGS	OTHER SPACINGS	OTHER SPACINGS	OTHER SPACINGS
AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE
9306C-HMI	9306C-HMI	9306C-HMI	9306C-HMI
11 GPM	11 GPM	11 GPM	11 GPM
214 GPM	214 GPM	214 GPM	214 GPM
JET AGITATION	JET AGITATION	JET AGITATION	JET AGITATION
2	2	2	2
1800 GAL.LON 380/90R46 SEE TIRE CHART	1800 GAL.LON 380/90R46 SEE TIRE CHART	1800 GAL.LON 380/90R46 SEE TIRE CHART	1800 GAL.LON 380/90R46 SEE TIRE CHART
2400 GAL.LON 480/80R42 SEE TIRE CHART	2400 GAL.LON 480/80R42 SEE TIRE CHART	2400 GAL.LON 480/80R42 SEE TIRE CHART	2400 GAL.LON 480/80R42 SEE TIRE CHART
10 BOLT	10 BOLT	10 BOLT	10 BOLT
265#	265#	265#	265#
12 VOLT 15 AMP 12 VOLT 10 AMP	12 VOLT 15 AMP 12 VOLT 10 AMP	12 VOLT 15 AMP 12 VOLT 10 AMP	12 VOLT 15 AMP 12 VOLT 10 AMP

7 SPECIFICATIONS CONTINUED

7.1 MECHANICAL 9600 SERIES

DIMENSIONS/INCHES	60 FOOT	80 FOOT	88 FOOT
Length: Field	253	253	253
Width: Field:	720	960	1056
Transport:	144	144	144
Height: Transport:	127	125	133
Weight: Empty:	6240	6610	6710
Tank Capacity (Gallons):	1000,1250	1000,1250	1000,1250
Working Spray Range:	17-72	17-72	17-72
Wheel Tread:	STD 80,88, 120	STD 80,88, 120	STD 80,88, 120
	OTHER SPACINGS AVAILABLE	OTHER SPACINGS AVAILABLE	OTHER SPACINGS AVAILABLE
PUMP	150-206	9306C-HM1	9306C-HMI
Hydraulically driven: (Input)	7-11 GPM	11 GPM	11 GPM
Performance: (Output)	120 GPM	214 GPM	214 GPM
Call for other pump options			
Tank Agitators:	JET AGITATION	JET AGITATION	JET AGITATION
Wash Head:	2	2	2
TIRES			
Trailer:	1000/1250 GALLON	1000/1250 GAL.LON	1000/1250 GAL.LON
Tire size	13.6 x 38	320/90R46	320/90R46
Pressure	SEE TIRE CHART	SEE TIRE CHART	SEE TIRE CHART
	OPTIONAL TIRE	OPTIONAL TIRE	OPTIOAL TIRE
Tire Size	320/90R46	380/90R46	380/90R46
Tire Pressure	SEE TIRE CHART	SEE TIRE CHART	SEE TIRE CHART
Hubs:	STANDARD 8-BOLT 10-BOLT/320/90R46	10 BOLT	10 BOLT
Lug Nut Torque:	265#	265#	265#
OPTIONAL: CONTROLLERS			
450 Raven			
Power: 12v	12 VOLT 15 AMP	12 VOLT 15 AMP	12 VOLT 15 AMP
Cab Fold Box:	12 VOLT 10 AMP	12 VOLT 10 AMP	12 VOLT 10 AMP

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

90 FOOT	100 FOOT
253	267
1080	1200
144	144
133	133
6730	6960
1000,1250	1000,1250
17-72	17-72
STD 80,88, 120	STD 80,88, 120
OTHER SPACINGS AVAILABLE	OTHER SPACINGS AVAILABLE
9306C-HMI	9306C-HMI
11 GPM	11 GPM
214 GPM	214 GPM
JET AGITATION	JET AGITATION
2	2
1000/1250 GAL.LON	1000/1250 GAL.LON
320/90R46 SEE TIRE CHART	320/90R46 SEE TIRE CHART
OPTIONAL TIRE 380/90R46 SEE TIRE CHART	OPTIONAL TIRE 380/90R46 SEE TIRE CHART
10 BOLT	10 BOLT
265#	265#
12 VOLT 15 AMP 12 VOLT 10 AMP	12 VOLT 15 AMP 12 VOLT 10 AMP

Checking Tire Pressure

CAUTION: Avoid loss of vehicle control during transport from failure of over-loaded tires, which could cause serious injury or death to you or others.

Equal pressure in all tires is necessary for even penetration. A low tire will cause deeper penetration on one side than other. Increased penetration on one side will result in side draft of machine. Inflate tires to shown specification.

Tire Size	Pressure
380/90R46 **LR168** (Singles)	538 kPa (8.38 bar) (78 psi)
380/90R46 **LR149** (Duals)	255 kPa (2.55 bar) (37 psi) Inner 227 kPa (2.28 bar) (33 psi) Outer
380/90R54 **LR170** (Singles)	517 kPa (5.17 bar) (75 psi)
380/90R54 **LR152** (Duals)	255 kPa (2.55 bar) (37 psi) Inner 227 kPa (2.28 bar) (33 psi) Outer
480/80R50 **LR176**	545 kPa (5.00 bar) (73 psi)
20.5 x 8-10	621 kPa (6.21 bar) (90 psi)
6.7R15	303 kPa (3.03 bar) (44 psi)

NOTE: Tire pressure is directly linked to LRXXX (bold italic). Make sure of the load rating of the tire before adding any air to the tire.

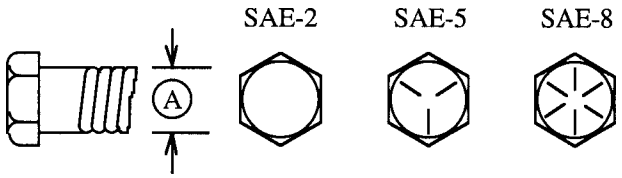
7.2 BOLT TORQUE

CHECKING BOLT TORQUE

The tables shown below give correct torque values for various bolts and capscrews. Tighten all bolts to the torques specified in chart unless otherwise noted. Check tightness of bolts periodically, using bolt torque chart as a guide. Replace hardware with the same strength bolt.

ENGLISH TORQUE SPECIFICATIONS

Bolt Diameter "A"	Bolt Torque * SAE 2 N.m	(lb-ft)	SAE 5 N.m	(lb-ft)	SAE 8 N.m	(lb-ft)
1/4"	8	(6)	12	(9)	17	(12)
5/16"	13	(10)	25	(19)	36	(27)
3/8"	27	(20)	45	(33)	63	(45)
7/16"	41	(30)	72	(53)	100	(75)
1/2"	61	(45)	110	(80)	155	(115)
9/16"	95	(70)	155	(115)	220	(165)
5/8"	128	(95)	215	(160)	305	(220)
3/4"	225	(165)	390	(290)	540	(400)
7/8"	230	(170)	570	(420)	880	(650)
1"	345	(225)	850	(630)	1320	(970)



Torque figures indicated above are valid for non-greased or non-oiled threads and heads unless otherwise specified. Therefore, do not grease or oil bolts or capscrews unless otherwise specified in this manual. When using locking elements, increase torque values by 5%.

* Torque value for bolts and capscrews are identified by their head markings.

7.3 HYDRAULIC FITTING TORQUE

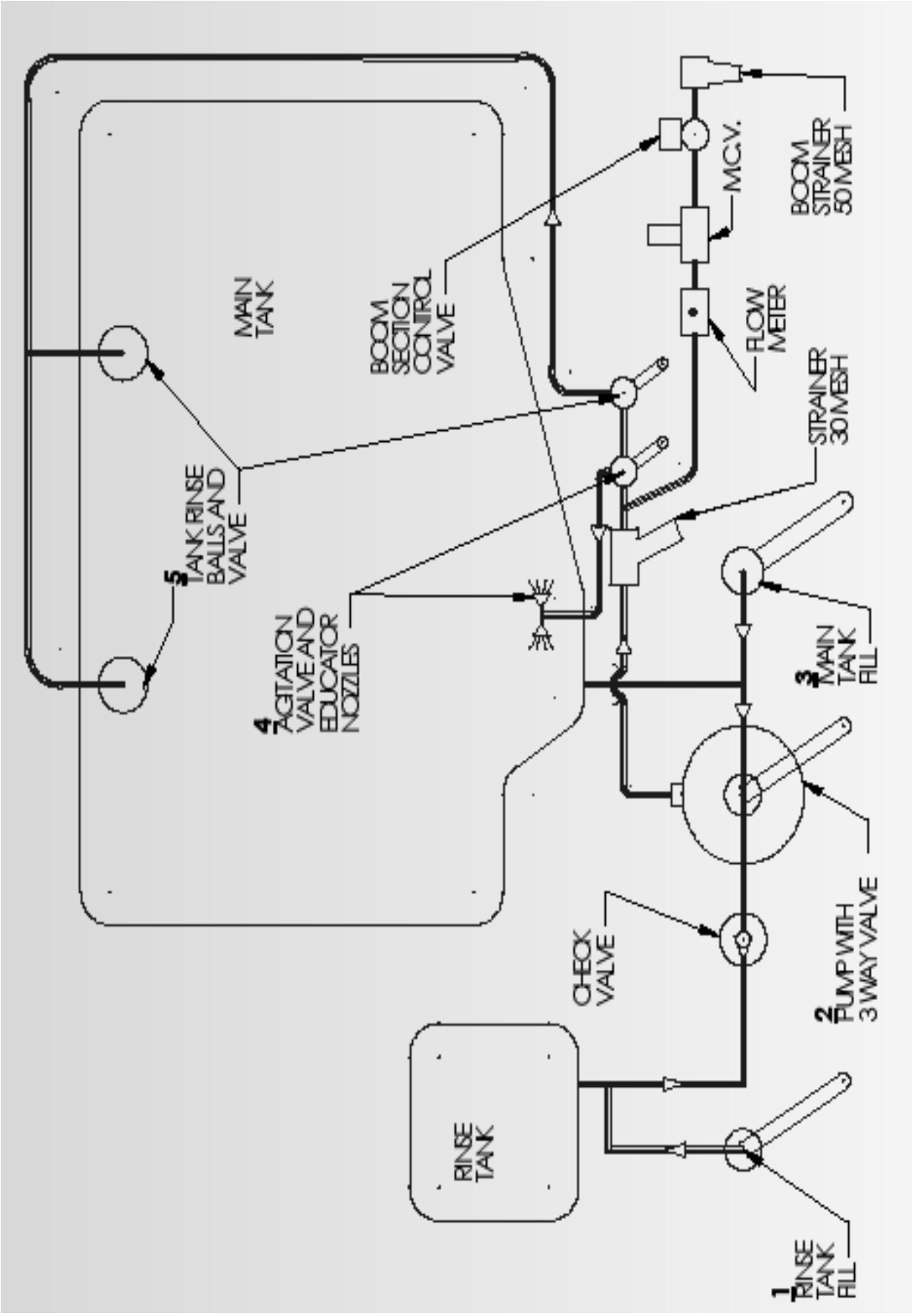
TIGHTENING FLARE TYPE TUBE FITTINGS *

1. Check flare and flare seat for defects that might cause leakage.
2. Align tube with fitting before tightening.
3. Lubricate connection and hand tighten swivel nut until snug.
4. To prevent twisting the tube(s), use two wrenches. Place one wrench on the connector body and with the second tighten the swivel nut to the torque shown.

* The torque values shown are based on lubricated connections as in reassembly.

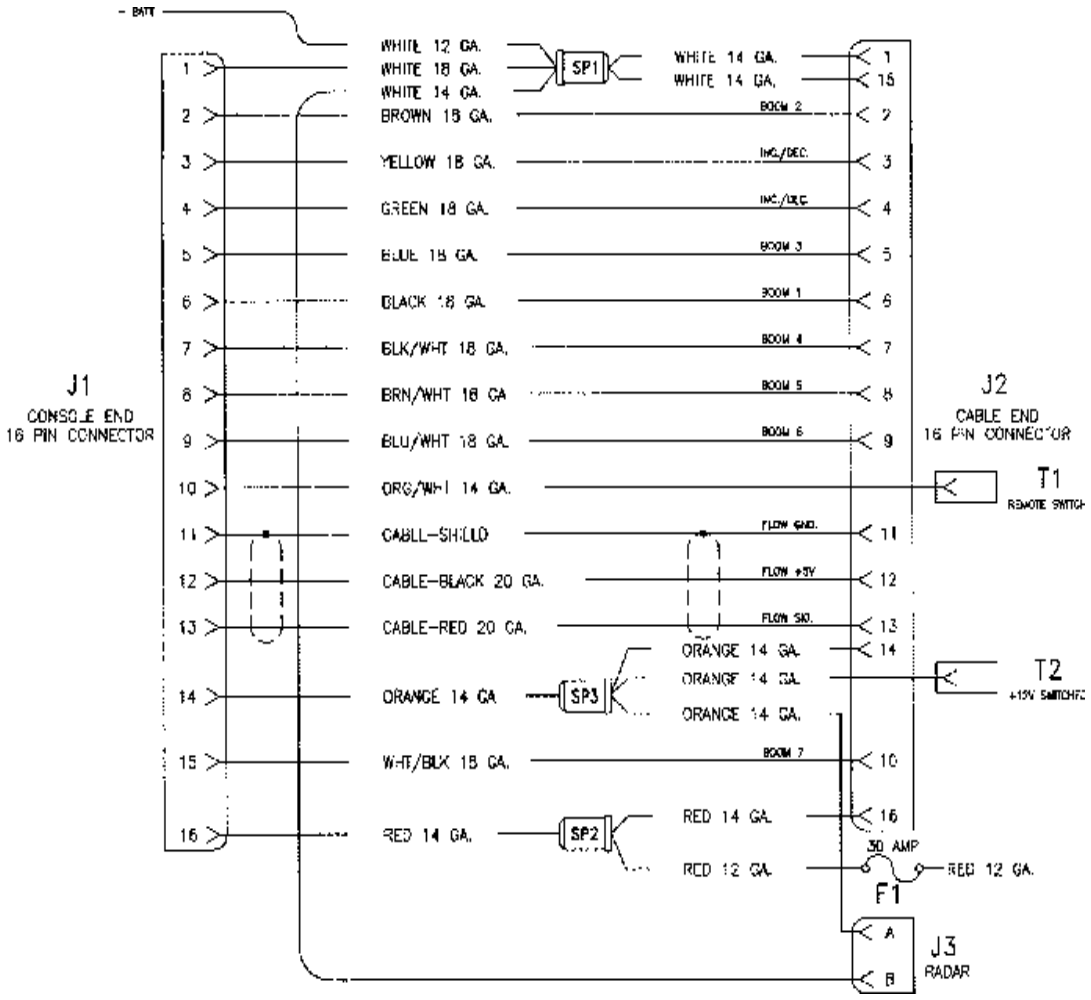
Tube Size OD	Nut Size Across Flats	Torque Value*		Recommended Turns to Tighten (After Finger Tightening)	
(in.)	(in.)	(N.m)	(lb-ft)	(Flats)	(Turns)
3/16	7/16	8	6	1	1/6
1/4	9/16	12	9	1	1/6
5/16	5/8	16	12	1	1/6
3/8	11/16	24	18	1	1/6
1/2	7/8	46	34	1	1/6
5/8	1	62	46	1	1/6
3/4	1-1/4	102	75	3/4	1/8
7/8	1-3/8	122	90	3/4	1/8

7.4 CHEMICAL CIRCUIT SCHEMATIC

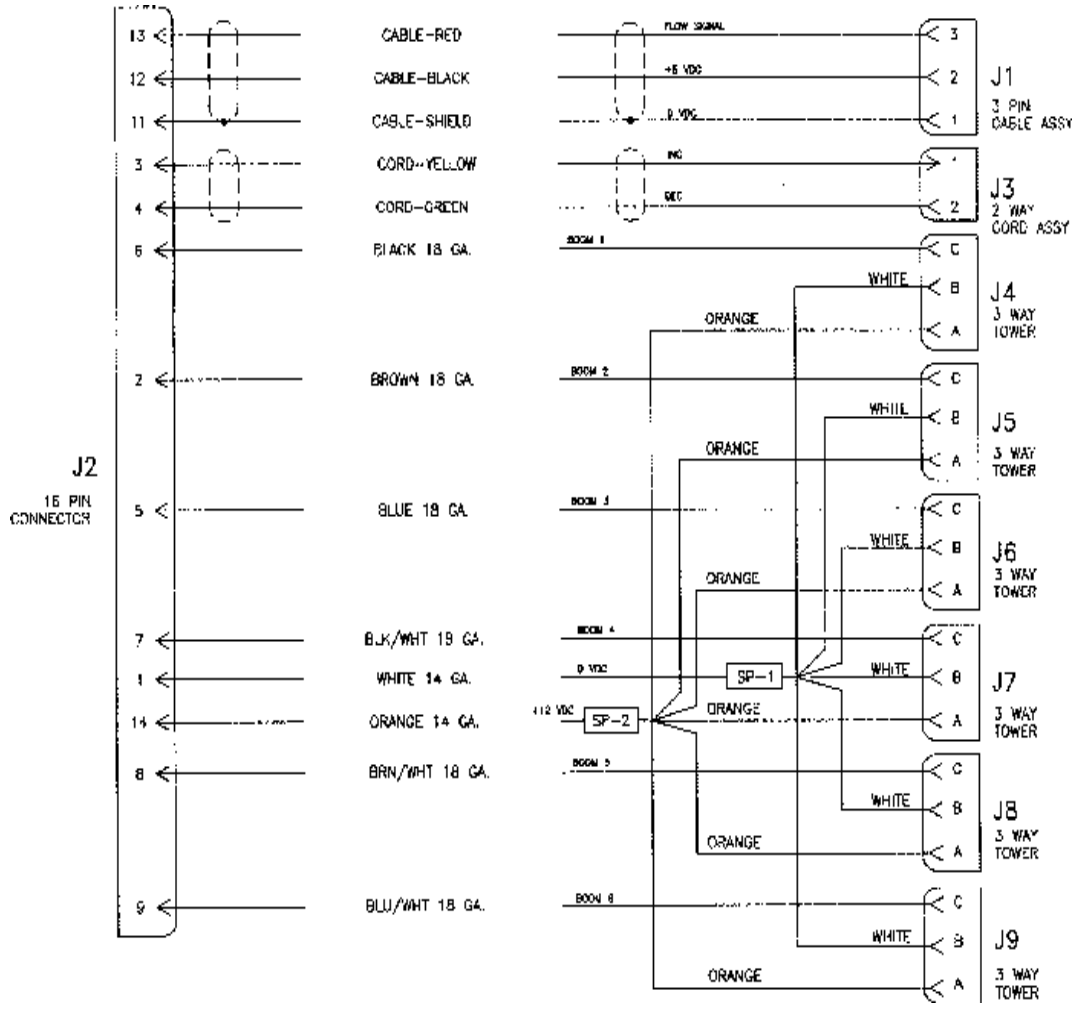


7.5 ELECTRICAL SCHEMATIC

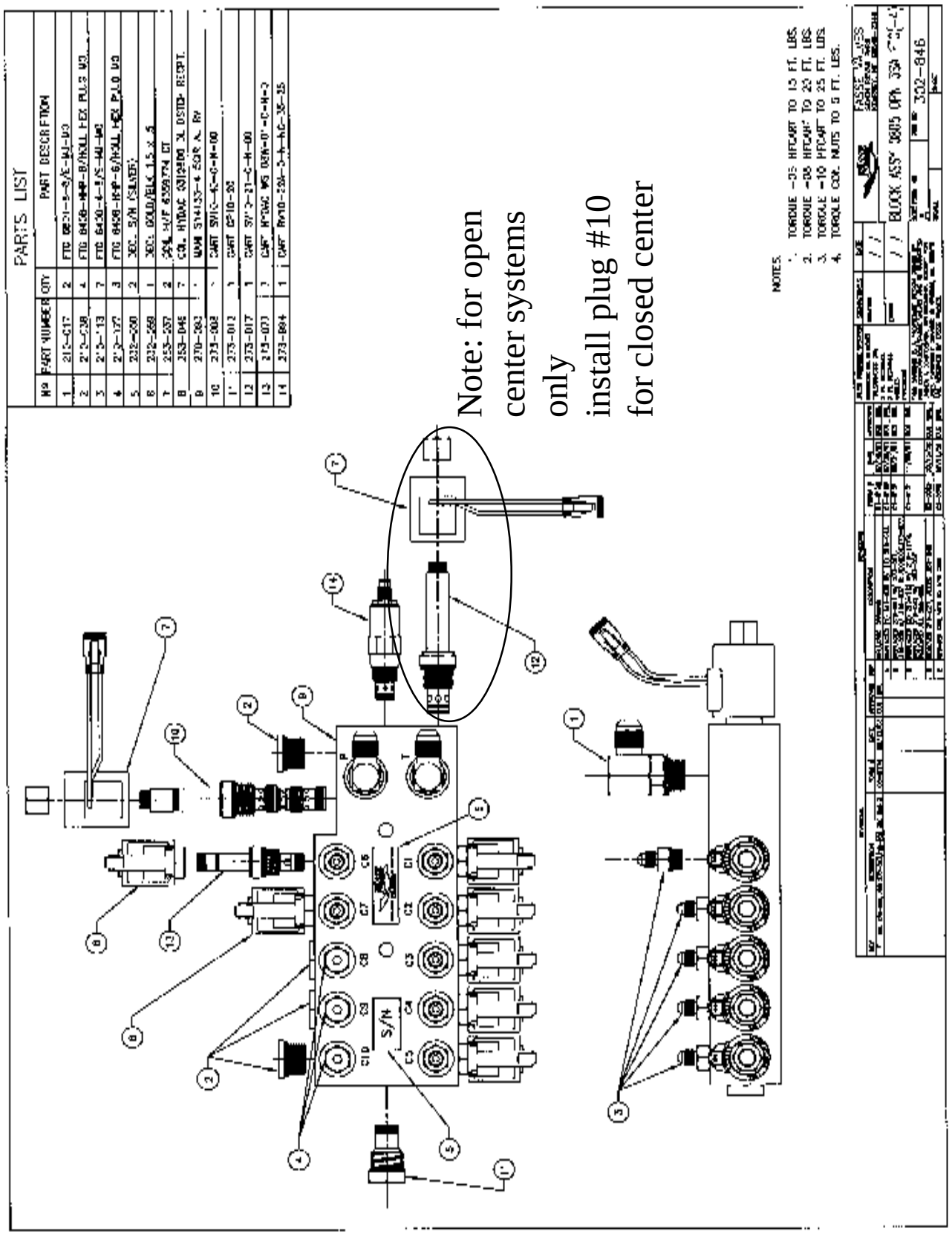
CABLE 10' CONSOLE 3 OR 6 BOOM SCS 440/450 CONSOLES



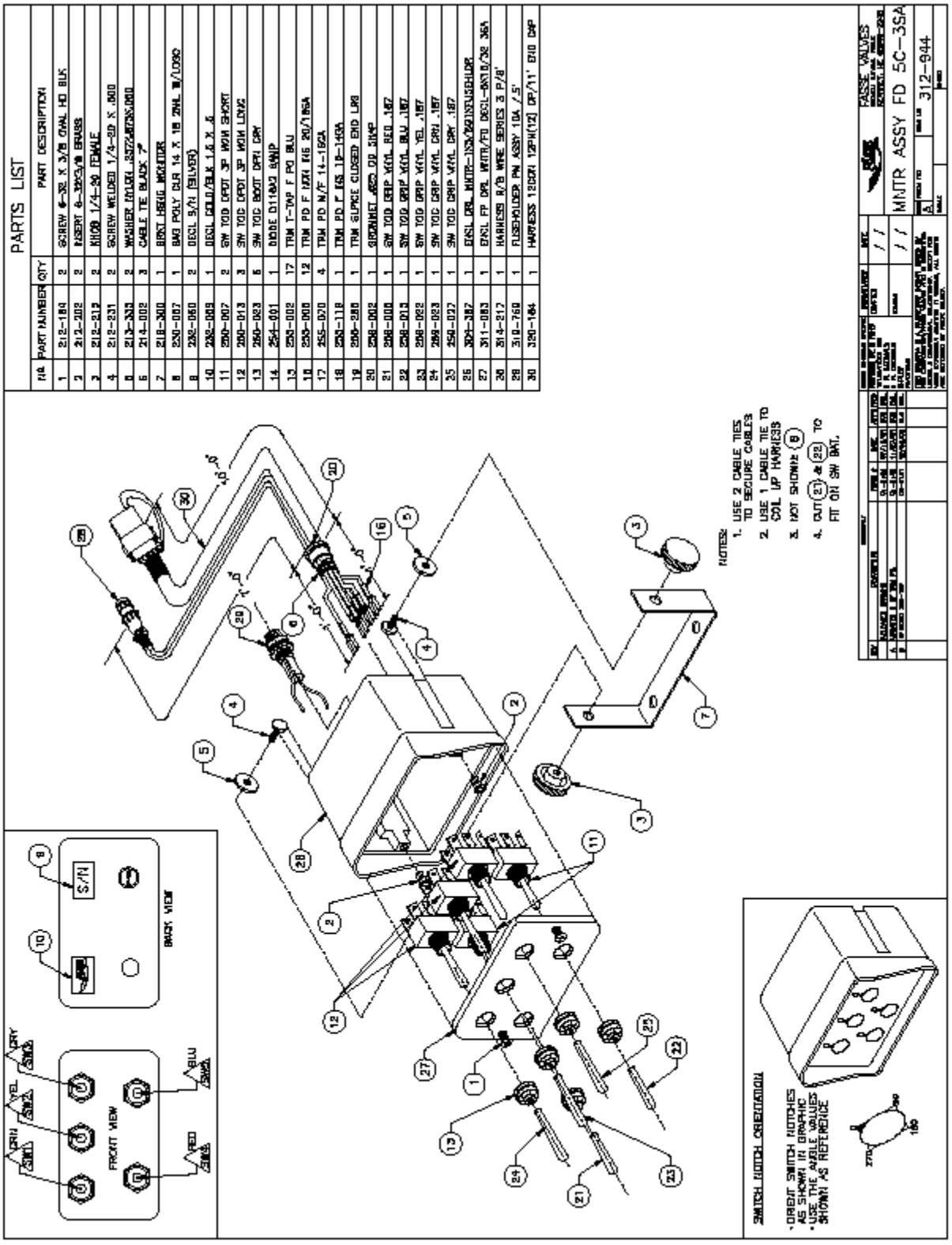
CABLE 33' FLOW CONTROLLER 3 OR 6 BOOM VALVES



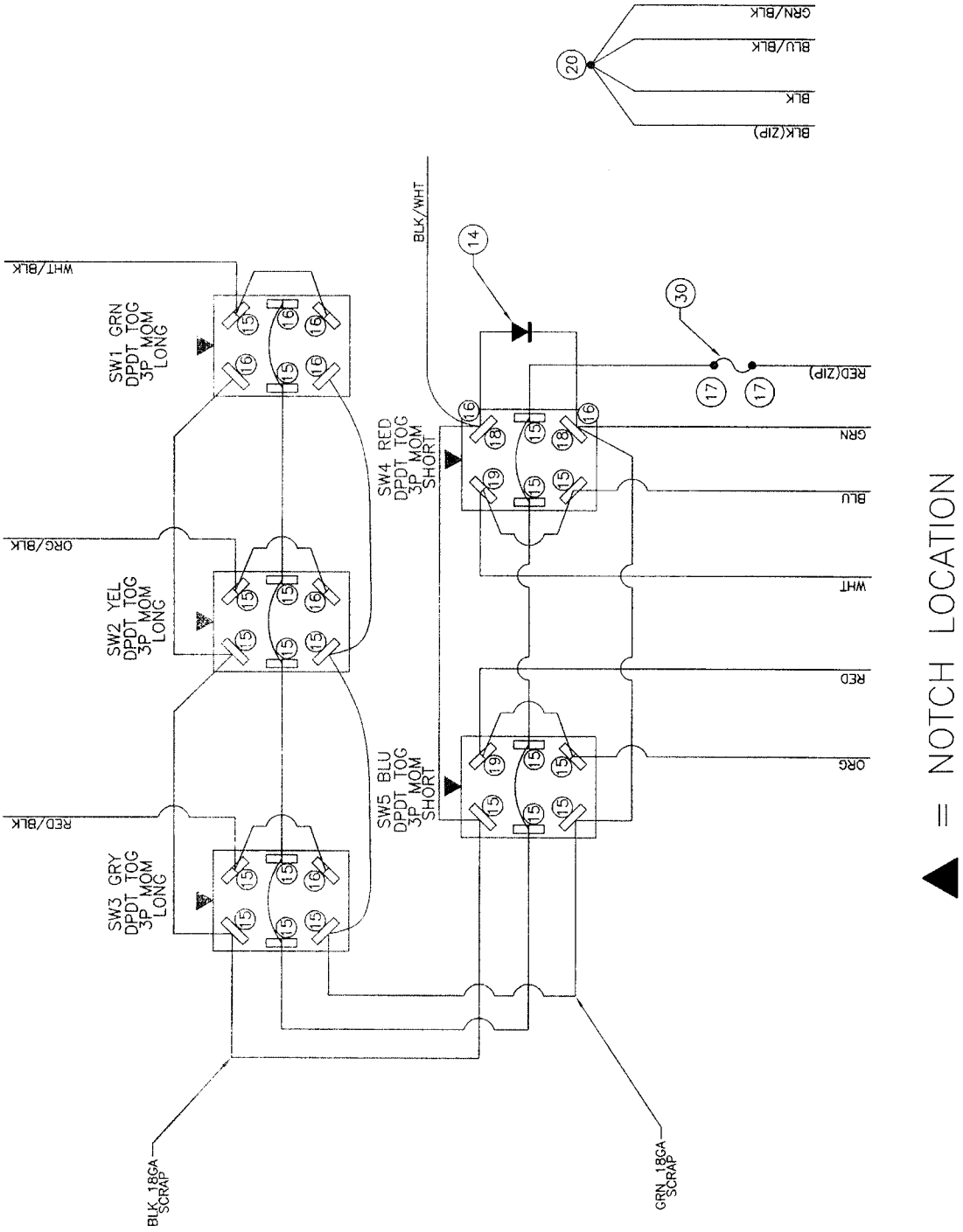
7.6 9500 SERIES 5 FUNCTION HYDRAULIC BLOCK 9600 SERIES 60'



7.7 9500 SERIES 5 FUNCTION HYDRAULIC CAB BOX 9600 SERIES 60'



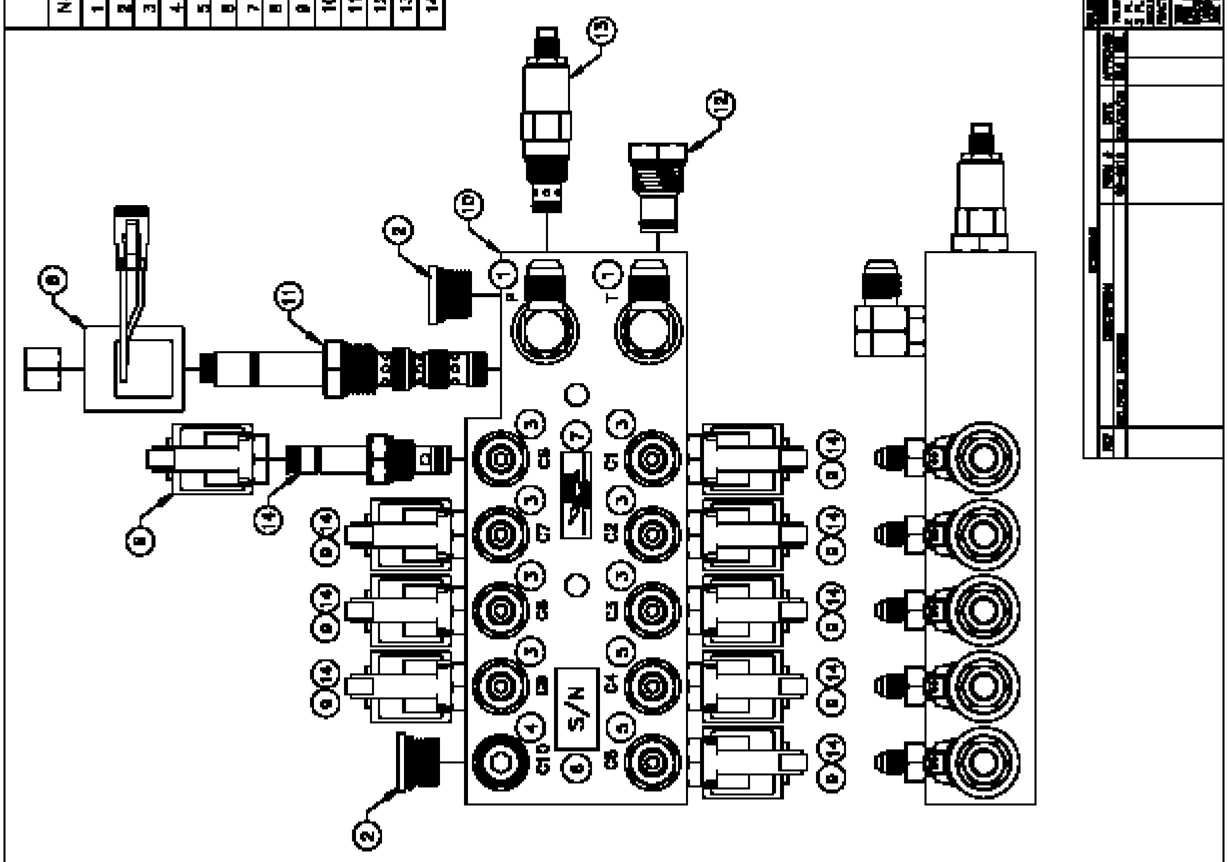
7.8 9500 SERIES 5 FUNCTION CAB BOX WIRING
9600 SERIES 60'



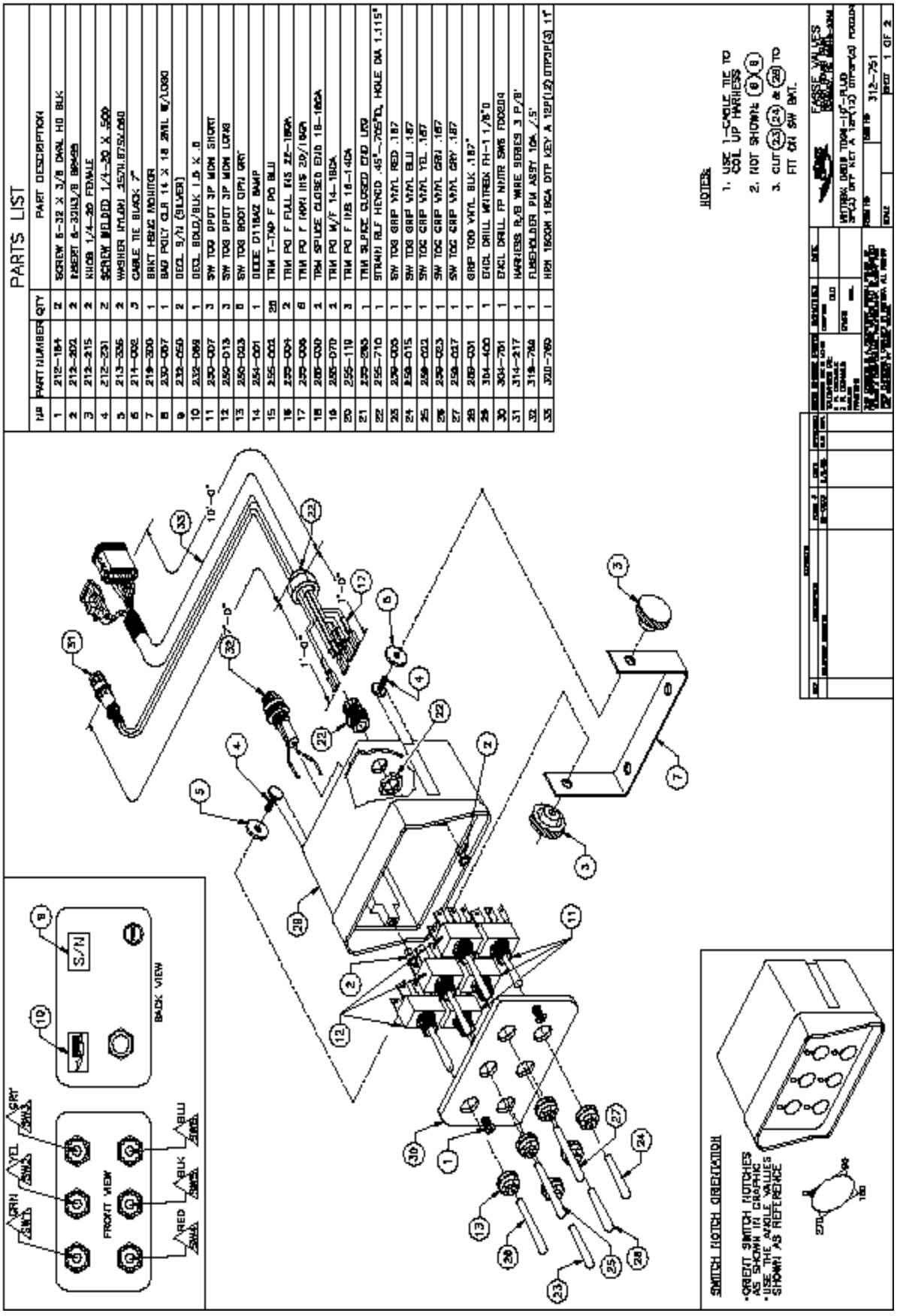
7.9 9600 SERIES 80-100' 6 FUNCTION HYDRAULIC BLOCK

PARTS LIST

Nº	PART NUMBER	QTY	PART DESCRIPTION
1	210-017	2	FTG 6801-8-8/E-MJ-MO
2	210-038	2	FTG 6408-HHP-8/HOLL HEX PLUG MO
3	210-113	7	FTG 6400-4-6/S-MJ-MO
4	210-127	1	FTG 6408-HHP-6/HOLL HEX PLUG MO
5	210-188	2	FTG 6400-6-6 R.047/S-MJ-MO
6	232-050	2	DECL S/N (SILVER)
7	232-068	1	DECAL FASSE BLK/GOLD 1"X.75"RND CRNR
8	253-037	1	COIL H/F 6359774 DT
9	253-046	9	COIL HYDAC 0312800 DL DSTCH RECPT.
10	270-083	1	MANI S14153-4 SCIR AL RV
11	273-008	1	CART SV10-40-0-N-00
12	273-012	1	CART CP10-20
13	273-058	1	CART H/F RV10-22A-0-N-NC-35-30
14	273-077	9	CART HYDAC WS08W-01-C-N-0

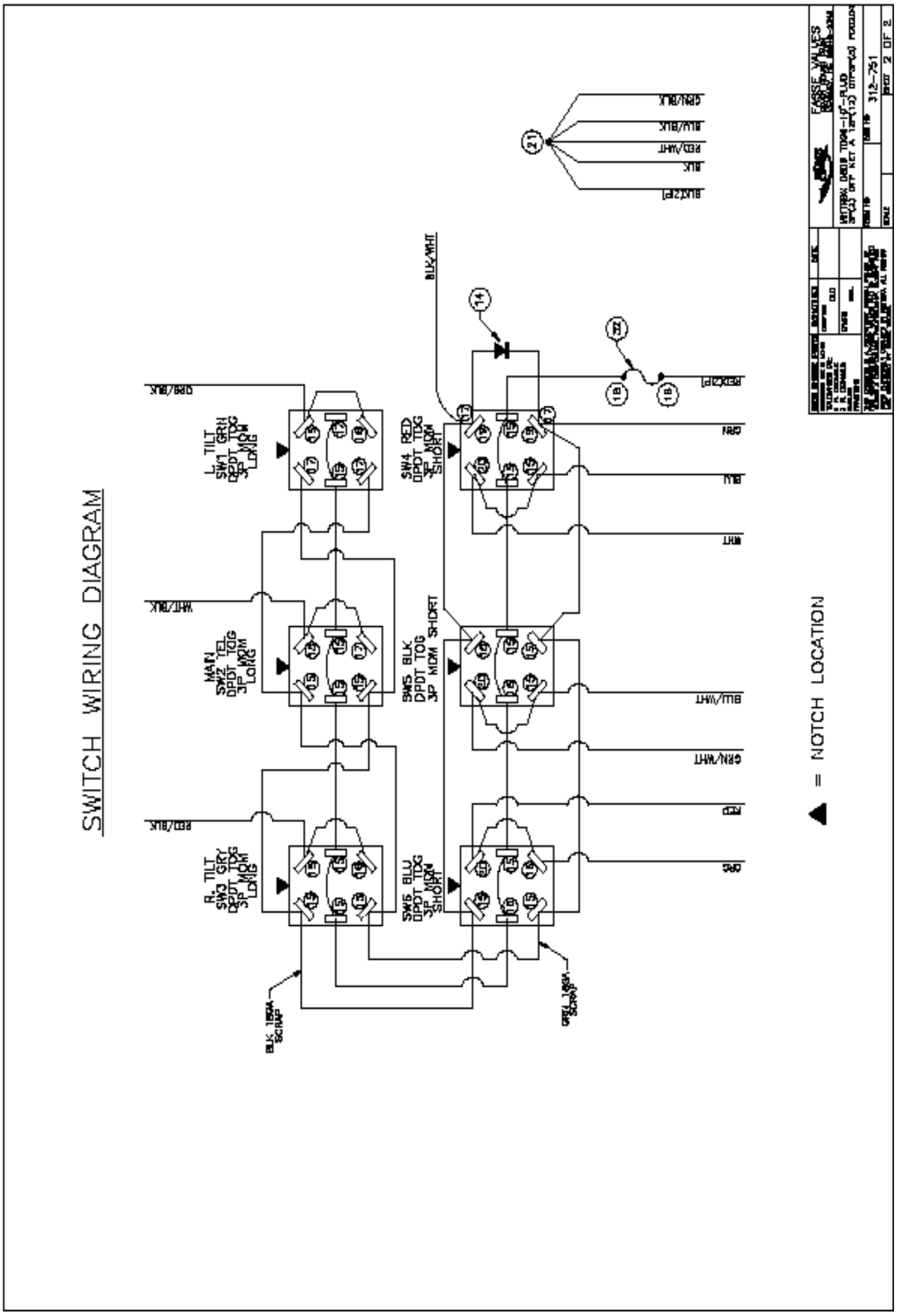


7.10 9600 SERIES 80-100' 6 STATION CAB BOX

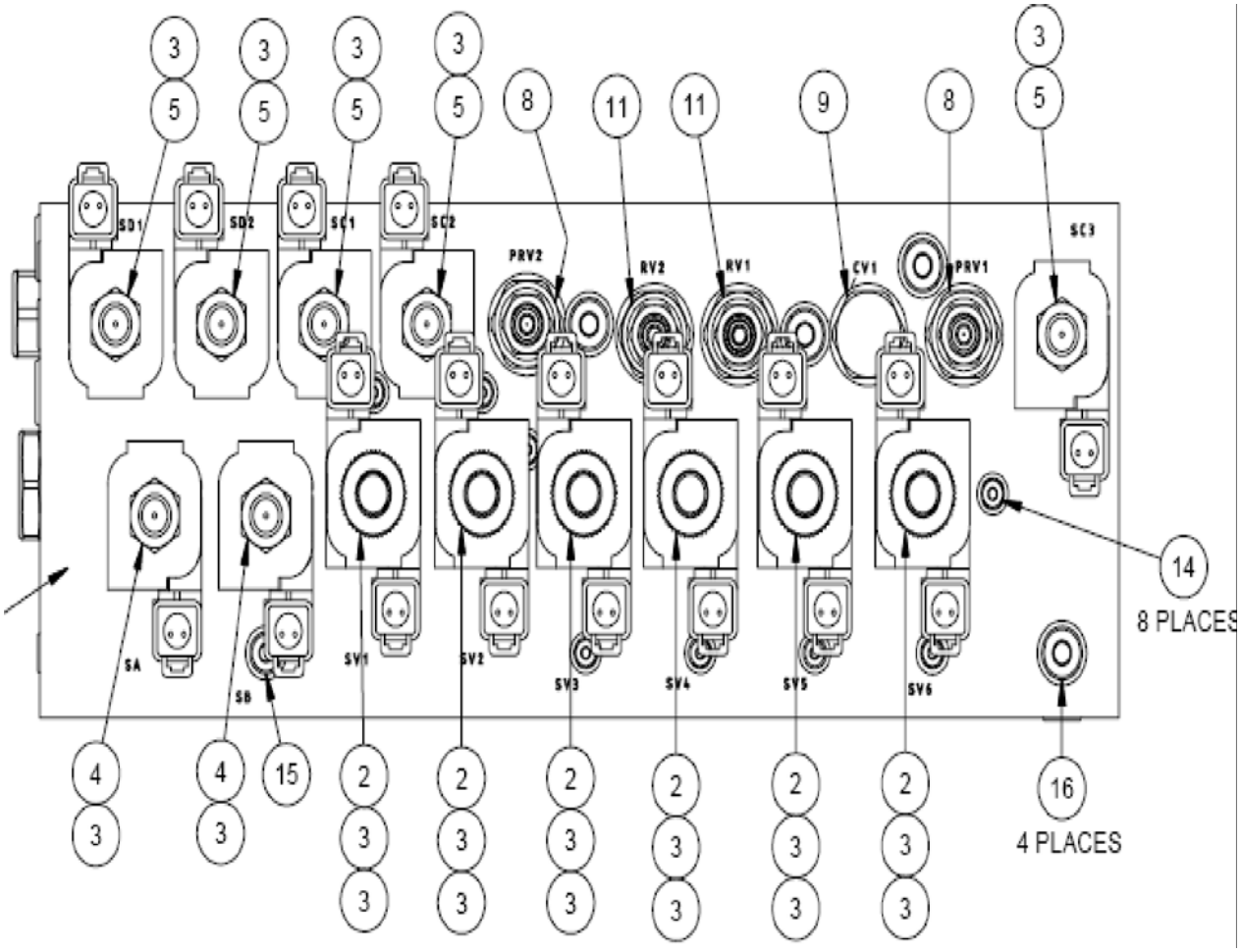


NO	PART NUMBER	QTY	PART DESCRIPTION
1	212-184	2	SCREW 6-32 X 3/8 OVAL HD BLK
2	212-202	2	INSERT 6-32UNS/8 BRASS
3	212-215	2	KNOB 1/4-20 FEMALE
4	212-231	2	SCREW MOLDED 1/4-20 X .500
5	213-336	2	WASHER NYLON .157ID.875OD.060
6	214-002	3	CABLE TIE BLACK 7"
7	219-300	1	BRKT HEAVY MOUNTER
8	230-007	1	BAG POLY CLR 14 X 18 2MIL W/LOGO
9	232-050	2	DECL S/N (SILVER)
10	232-069	1	DECL BOLD/BLK 1.5 X .5
11	250-007	3	SW TOG DPDT 3P MOM SHORT
12	250-013	3	SW TOG DPDT 3P MOM LONG
13	250-023	6	SW TOG BOOT DPDT GRY
14	254-001	1	DIODE D1184Z RAMP
15	255-004	25	TRM T-TAP F PO BLU
16	255-004	2	TRM PO F FULL INS 22-18GA
17	255-006	6	TRM PO F FULL INS 20/16GA
18	255-030	1	TRM SPLICE CLOSED END 18-16GA
19	255-070	2	TRM PO W/F 14-18GA
20	255-119	3	TRM PO F INS 16-14GA
21	255-265	1	TRM SLPICE CLOSED END LRG
22	255-710	1	STRAIN RLF MINOD .45"-.705"ID, HOLE DIA 1.115"
23	258-005	1	SW TOG GRP VINYL RED .187
24	258-015	1	SW TOG GRP VINYL BLU .187
25	258-021	1	SW TOG GRP VINYL YEL .187
26	258-023	1	SW TOG GRP VINYL GRN .187
27	258-027	1	SW TOG GRP VINYL GRY .187
28	258-031	1	GRP TOG VINYL BLK .187"
29	304-400	1	ENCL DRILL MATRIX FH-11/8"D
30	304-701	1	ENCL DRILL FP NEMA SWS FD6004
31	314-217	1	HARNESS R/B WIRE SERIES 3 P/B"
32	318-756	1	FLASHOLDER PM ASSY 10A /5'
33	320-769	1	HRN 1600M 18GA DTP KEY A 12P(12) DTP2P(3) 11'

7.11 9600 SERIES 80-100' 6 STATION CAB BOX WIRING



7.12 9500 SERIES 120-132' YAW BLOCK



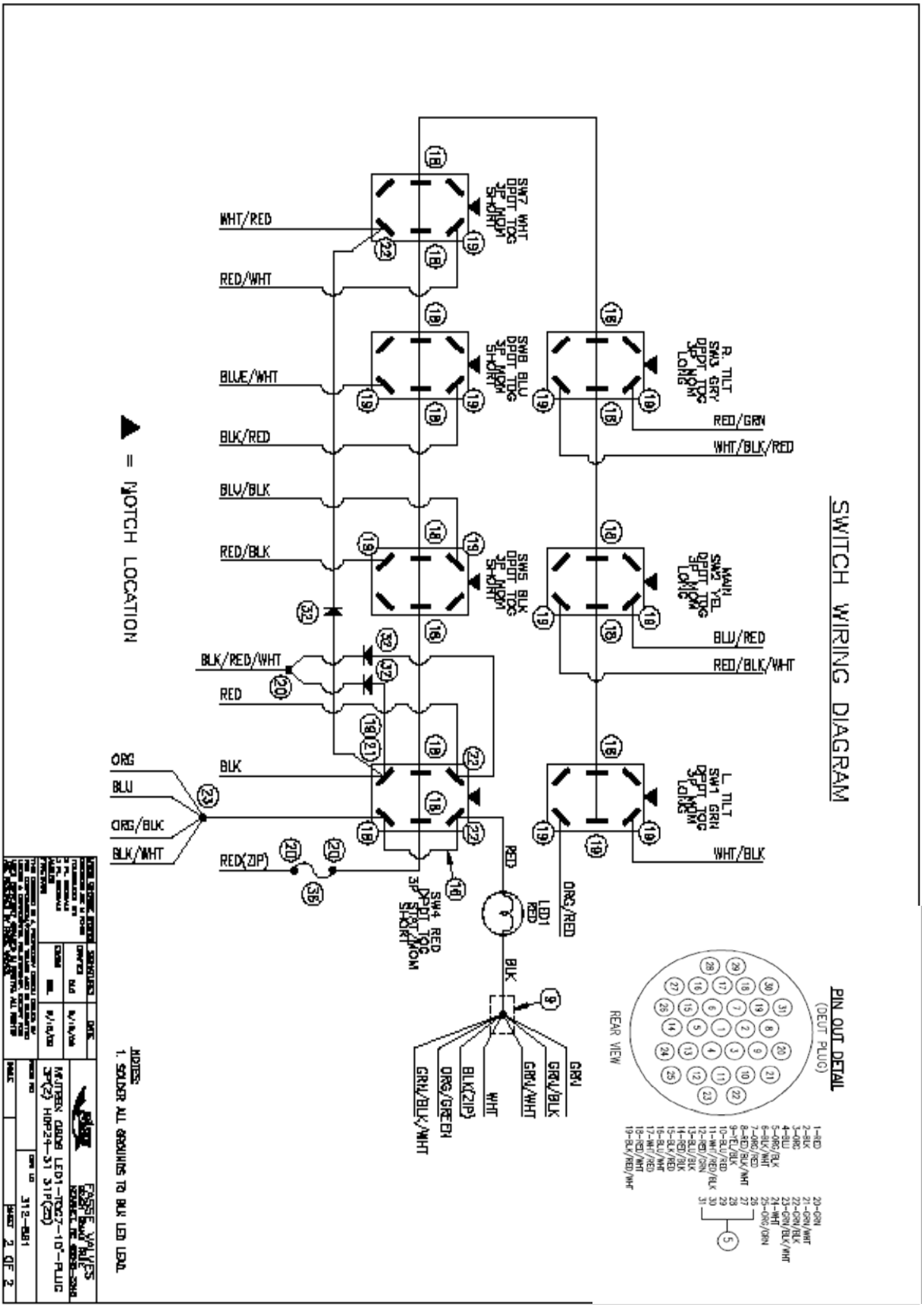
7.12 PARTS LIST FOR YAW BLOCK

7.13 9500 SERIES 120-132' YAW BLOCK HARNESS

FD19-33-HDP20-31P BLOCK HARNESS				
Function	Selonoid Nom	Conductor Color	31 Pin Deutsch	2P DEUTSCH FEMALE
Main Wing Field	SA	RED	1	1
Main Wing Transport	SB	BLACK	2	2
Main Wing	SC1	ORANGE	3	3
Main Wing	SC2	BLUE	4	4
Main Wing	SD1	ORANGE/BLACK STRIPE	5	5
Main Wing	SD2	BLACK/WHITE STRIPE	6	6
Left Wing Up	SV1-1 (Bottom)	ORANGE/RED STRIPE	7	7
Left Wing Down	SV1-2 (Top)	WHITE/BLACK STRIPE	8	8
Main Lift Up	SV3-1 (Bottom)	RED/BLACK & WHITE STRIPE	9	9
Main Lift Down	SV3-2 (Top)	BLUE/RED STRIPE	10	10
Right Wing UP	SV2-1 (Bottom)	WHITE/RED & BLACK STRIPE	11	11
Right Wing Down	SV2-2 (Top)	RED/GREEN	12	12
Flip Wing Field	SV4-1 (Bottom)	BLUE/BLACK STRIPE	13	13
Flip Wing Transport	SV4-2 (Top)	RED/BLACK STRIIPE	14	14
Wing Tips Field	SV5-1 (Bottom)	BLACK/RED STRIPE	15	15
Wing Tips Transport	SV5-2 (Top)	BLUE/WHITE STRIPE	16	16
Hitch Transport	SV6-1 (Bottom)	WHITE/ RED STRIPE	17	17
Hitch Field	SV6-2 (Top)	RED/WHITE STRIPE	18	18
Yaw Lockout	SC3	BLACK/RED&WHT STRIPE	19	19
Ground	SV1-1, SV1-2, SA	GREEN	20	
Ground	SV2-1, SV2-2, SC1	GREEN/WHITE STRIPE	21	
Ground	SV3-1, SV3-2, SB	GREEN / BLACK STRIPE	22	
Ground	SV4-1, SV4-2, SC2	GREEN/BLACK &WHITE STRIPE	23	
Ground	SV5-1, SV5-2, SD1	WHITE	24	
Ground	SV6-1, SV6-2, SD2	ORANGE/GREEN STRIPE	25	

7.14 9500 SERIES 120-132' YAW CAB BOX

7.15 9500 SERIES 120-132' YAW CAB BOX WIRING



8 INDEX

Kwick Initial Startup Sheet

The information provided on this sheet is a quick-start guide to hookups and programming of this machine. **Before operating sprayer all operation and safety manuals must be reviewed and followed!** Much more detailed information is included in the manuals and also additional programming options.

Cab electrical hookups for 12 volt negative ground systems only !

Raven 450 console cable	Plug the 16 pin connector into the back of the console and also the 3 pin speed sensor cable.
Large 12 gauge red wire	Connect to positive (+) battery terminal or positive electrical outlet. Raven provides an in-line fuse. If you remove this make sure this connection is still fused at 30 amps.
Large 12 gauge white wire	Connect to negative (–) battery terminal or negative electrical outlet.
Orange wire , positive (+) power switched by the on/off switch on the Raven console. Does not have to be hooked up.	Can be used to power sky-track speed sensor or remote run/hold switch.
Orange/white wire -remote run/hold wire used primarily with an on/off foot switch or remote control on/off switch. Does not have to be hooked up.	Supplying positive (+) 12 volts to this wire will override the master on/off switch on Raven console and turn the booms on.
Dual weather pack connector with orange wire and white wire . Does not have to be hooked up.	Orange is positive (+) power and white is (–) negative switched by Raven console on/off switch. Can be used to power other options using 10 amps or less.
Boom Function Control Box (toggle box) Standard with a three prong universal plug-in connector.	If your tractor is not equipped with this style connector the plug can be cut off and wired as follows: Red-positive, Black-negative.
Sky track Speed Sensor	Blue wire to positive 12 volts hot.
Foam Marker	Black wire to 12 volts negative (-) White wire to 12volts
Raven G1 and G2 Autoboom	Black wire to 12 volts negative (-) Red wire to 12volts positive (+)
Norac Sonic Boom Height cable	Standard with a three prong universal plug-in connector.

Raven 450 console programming

Turn power switch to on. If screen does not light up recheck your power connections.	Screen should read US. If not press CE key on console until you scroll to US. When the screen reads US press enter.
Screen should now read SP1.	SP 1 is used for wheel magnet and proximity style sensors. SP 2 is used for radar and GPS (sky tracker) applications. Use the CE key to scroll to correct setting and press enter.
Screen should now read C-SD-STANDARD VALVE.	This is the valve used on Fast Sprayers. Scroll with the CE key until C-SD-STANDARD appears and then press enter.

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